TELESTAR DVD 2003

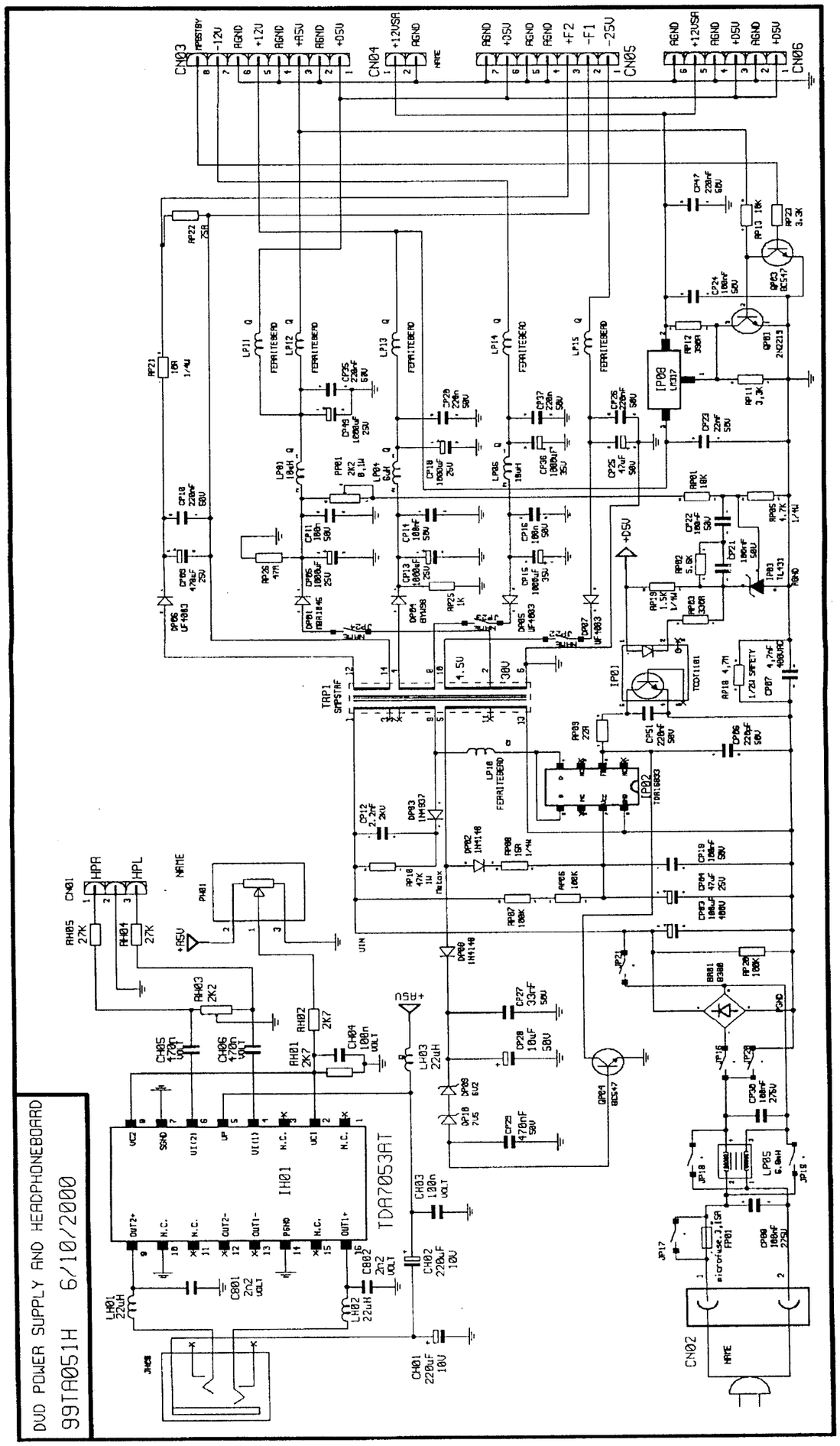
MODEL

SERVICE MANUAL

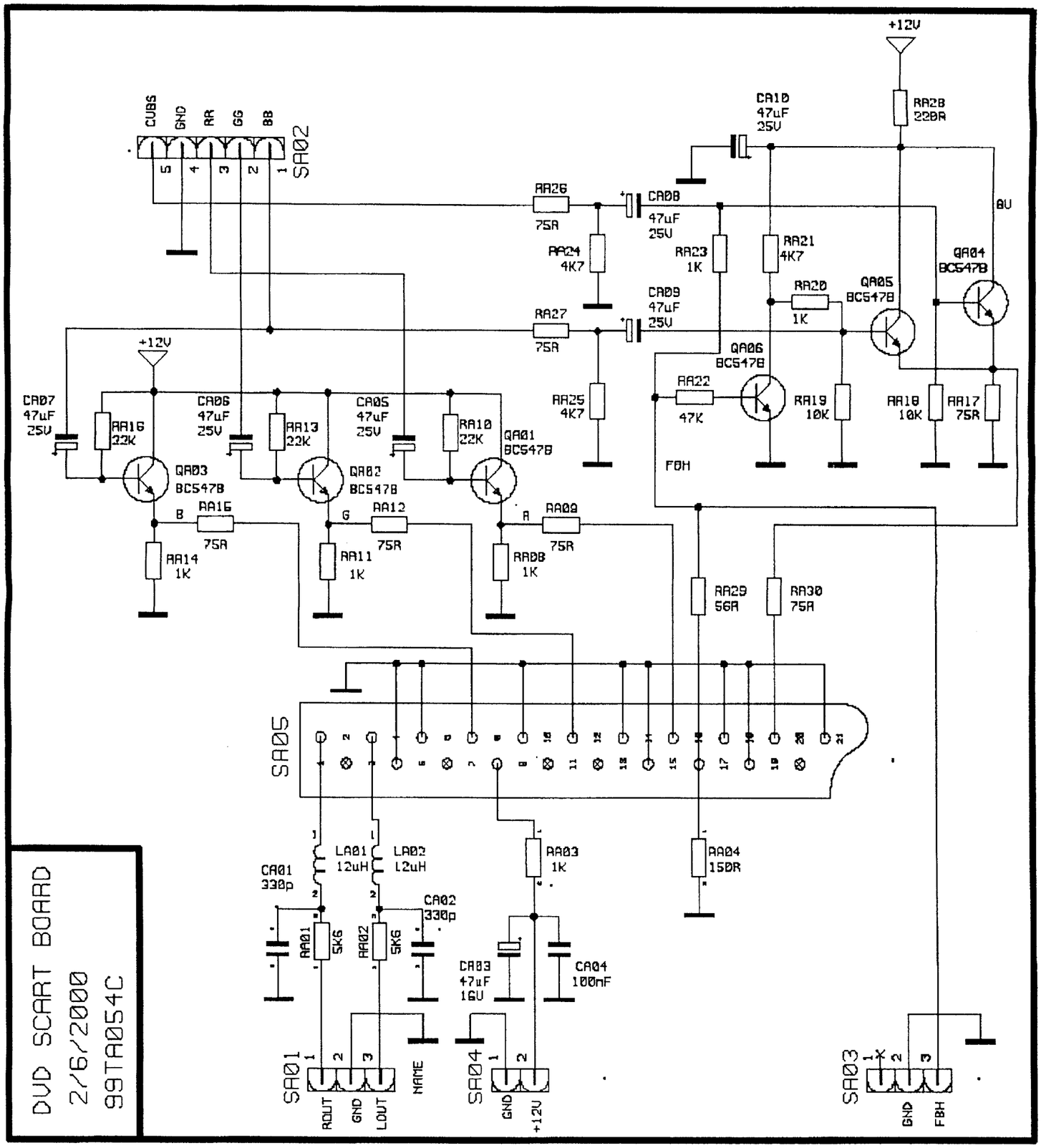
CONTENTS

	PAGE
1. Power Supply	4
2. Scart	5
3. Block Diagram (Cable Connections)	6
4. Functional Descriptions	7
DVD Mainboard	7
Front Panel	8
Front Panel Interface	9
DVD Driver	11
Connections	12
5. Description of the Integrated Circuits	13
6. Fault Tracing Flow Chart	19
7.Component List	22

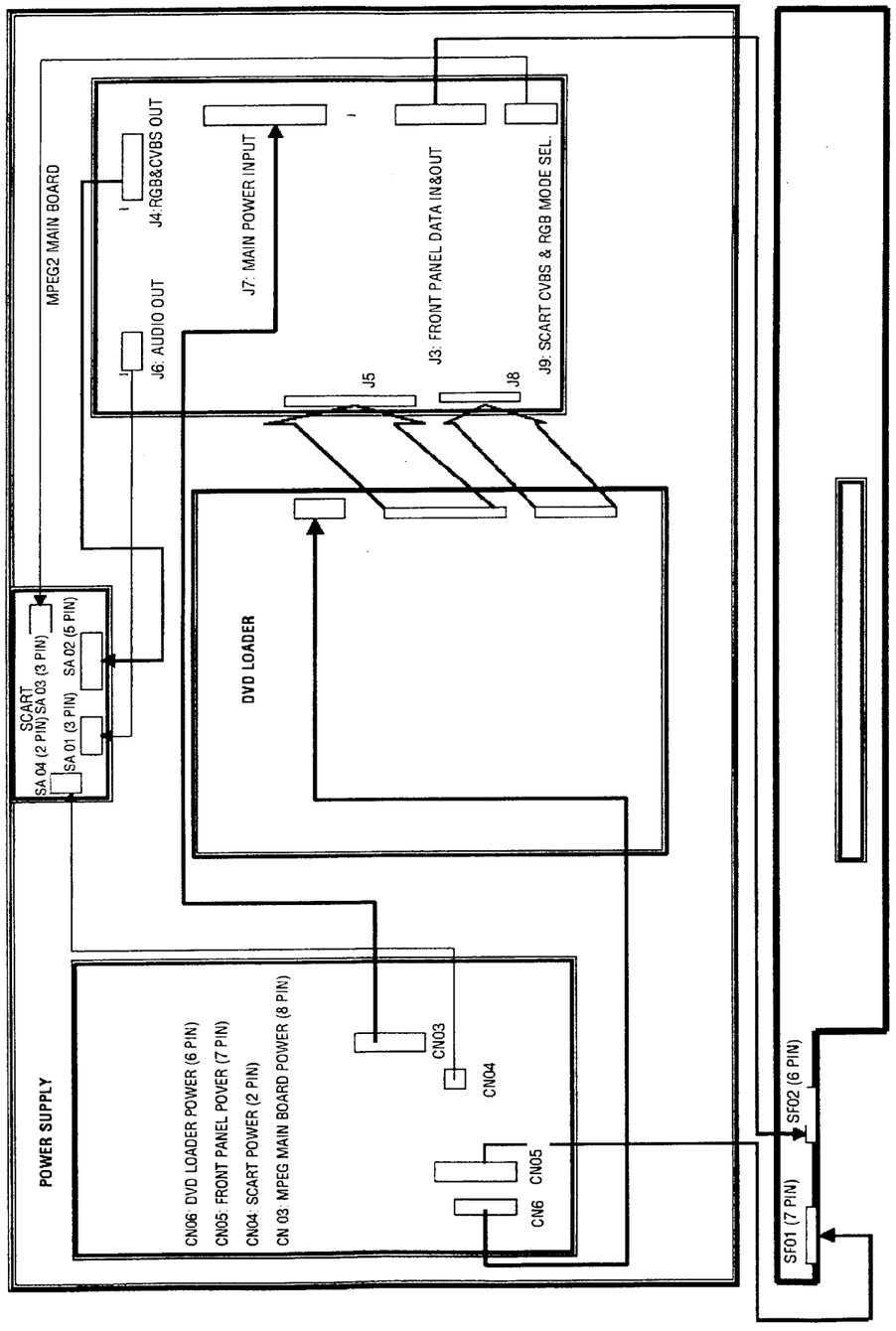
1. POWER SUPPLY



2. SCART

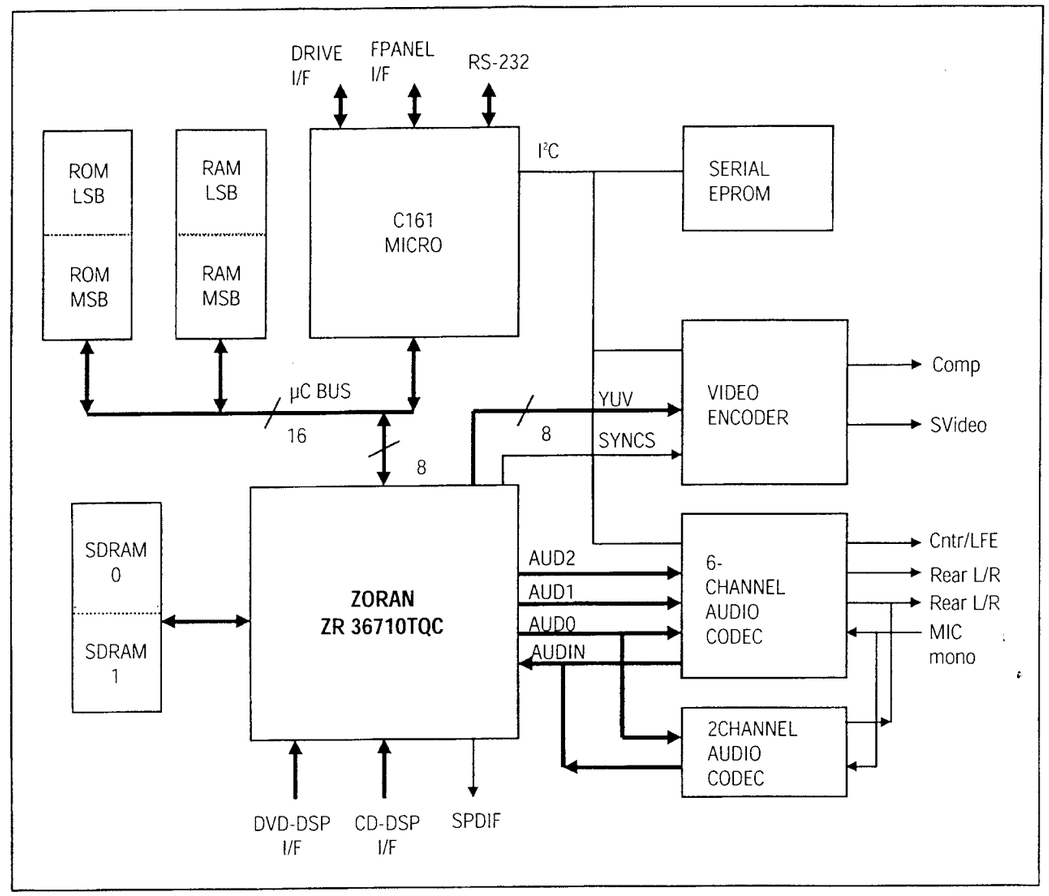

+12V
CUBS
GND
RR
GG
BB
SA02
5
4
3
2
1
CA10
47uF
25V
RA28
220R
RA26
75R
CA08
47uF
25V
8V
RA24
4K7
RA23
1K
RA21
4K7
QA04
BC547B
CA09
47uF
25V
RA27
75R
RA20
1K
QA05
BC547B
QA06
BC547B
RA22
47K
RA19
10K
RA18
10K
RA17
75R
RA25
4K7
FBH
+12V
CA07
47uF
25V
RA16
22K
CA06
47uF
25V
RA13
22K
CA05
47uF
25V
RA10
22K
QA01
BC547B
QA03
BC547B
QA02
BC547B
B
RA15
75R
G
RA12
75R
R
RA09
75R
RA14
1K
RA11
1K
RA08
1K
RA29
56R
RA30
75R
SA05
LA01
12uH
LA02
12uH
RA03
1K
RA04
150R
CA01
330p
CA02
330p
RA01
5K6
RA02
5K6
CA03
47uF
16V
CA04
100nF
SA01
1
2
3
ROUT
GND
LOUT
NAME
SA04
1
2
GND
+12V
SA03
1
2
3
GND
FBH
DVD SCART BOARD
2/6/2000
99TA054C

2. BLOCK DIAGRAM (CABLE CONNECTIONS)



3. FUNCTIONAL DESCRIPTIONS

3.1 DVD Mainboard



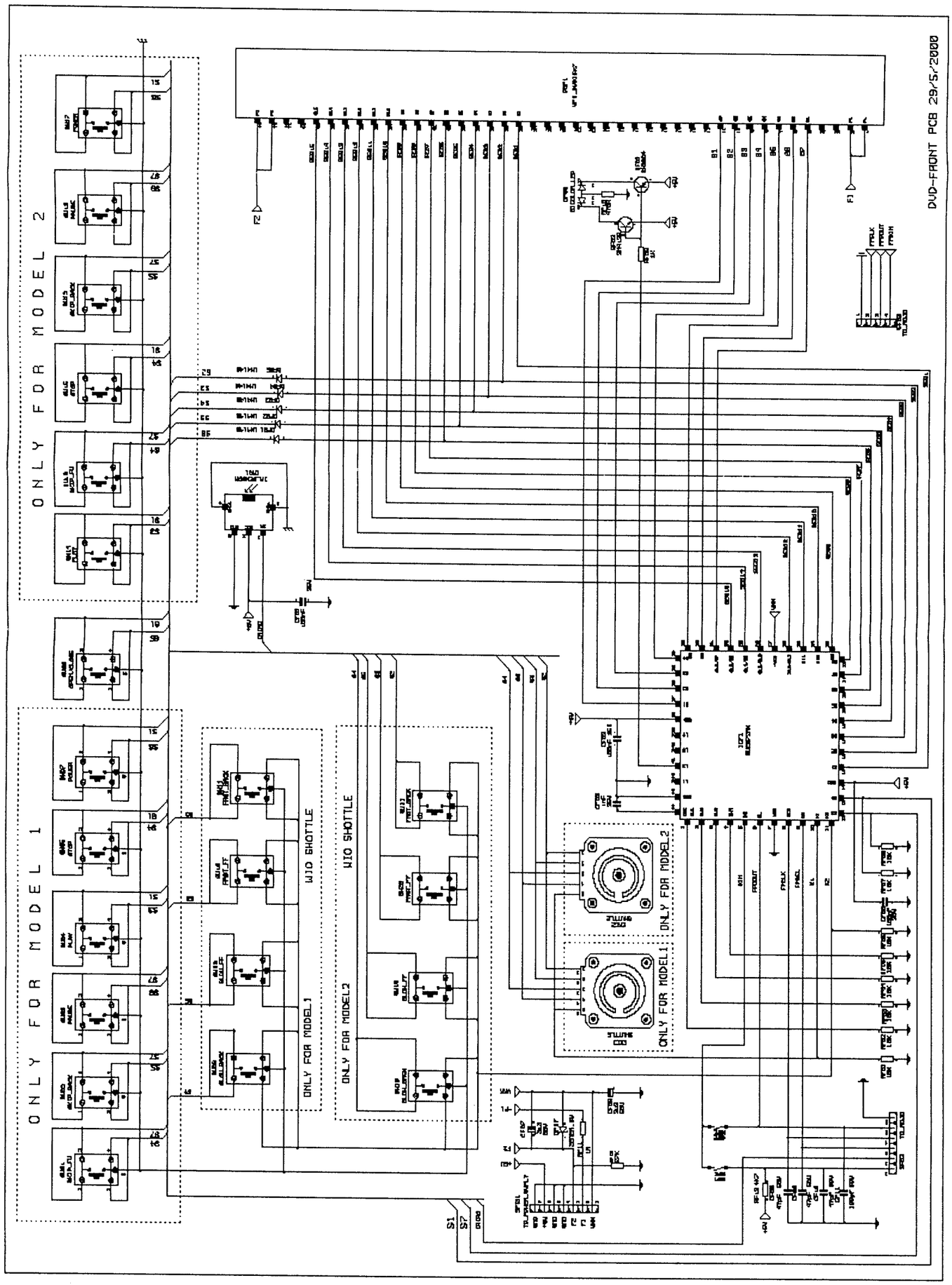
This board implements the back-end circuitry of a DVD player. It is composed of the following subsystems:

- Microcontroller which does main control to all other sub-blocks of the system including user interface, driver interface, audio/video output.
- Vaddis A/V Decoder IC decodes the bitstream coming from the DVD front-end drive, and optionally performs audio and video effects.
- Audio Codec
- Video Encoder

The board receive +5V and +12V from the power supply. The +5V is used to power all board logic. The +3.3V for the Vaddis and SDRAMs is generated with an on-board linear regulator from the +5V. The +12V, which can be optionally reduced to +9V, is used only to supply power to the drive unit.

3.2 Front Panel

The front panel I/O is controlled by the BU2872AK and PT 6312LQ (Optional) driver.



3.2.1 Front Panel Interface

6-Pin, Data Connector Pin Assignments

PIN	NAME	DIRECTION	DESCRIPTION
1	FPDIN	I	Front Panel Data input
2	IRIRQ#	I	IR sensor interrupt
3	FPSEL	O	Front Panel chip select
4	FPCLK	O	Front Panel clock
5	FPDOUT	O	Front Panel Data output
6	GND		

7 Pin, Power Connector Pin Assignments

PIN	NAME	FROM	DESCRIPTION
1	-25 V	SMPS	Segment and grid Voltage of the VFD
2	-F1	SMPS	provide a DC supply to the cathode. To overcome the voltage difference between one and the other of the cathode,
3	+F2	SMPS	
4	GND	SMPS	
5	GND	SMPS	
6	D5V	SMPS	Supplies IR and Front IC

There are 3 different devices operated by the BU2872 and PT6312LQ (Optional):

- Vacuum Fluorescent Display (VFD)
- Push-buttons
- LEDs

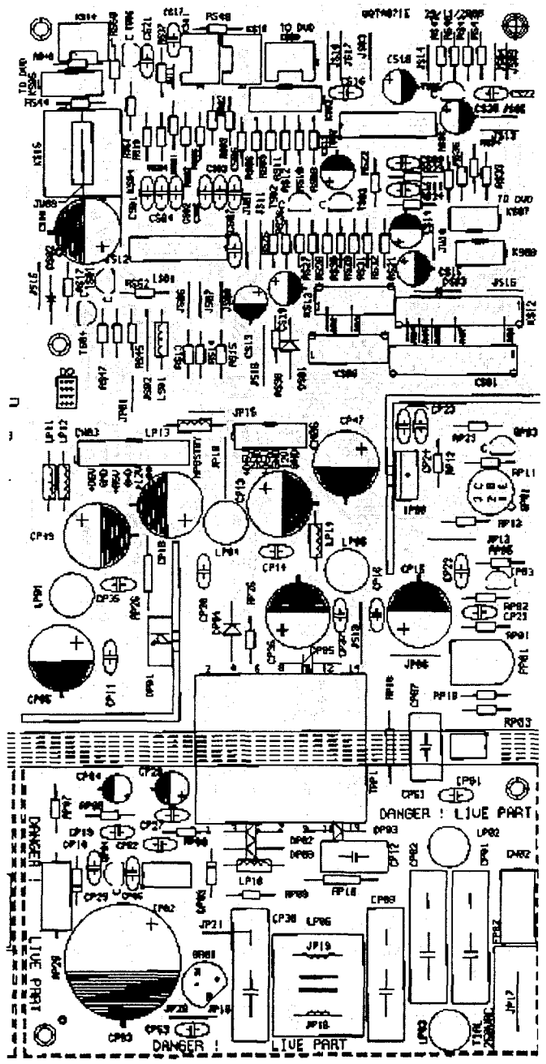
There is an option for a tray lamp and a joystick which is not currently assembled. The VFD display is custom made, implemented in a 7 grids by 15 segment matrix.

The VFD needs special voltage supply for operation:

- Vkk which is -25v needed to drive the segments and grids of the VFD.
- Vf1, Vf2 which powers the electron cloud filament (cathode) with a differential voltage of 4.3v. This is a floating voltage difference generated by the power supply, and is biased to -20v in the front panel board by a Zener circuit from the -25v (Vkk) supply. Moving the bias towards a more positive number will reduce the segment brightness. Vf1 & Vf2 provide a DC supply to the cathode. To overcome the voltage difference between one end and the other of the cathode, it is geometrically tilted so that the segments observe the same potential and have all the same brightness. Other way to overcome the problem is to employ an AC supply to power the Vf1 and Vf2.

3.3 SMPS

The mains power(220VAC) fed from CN02 is filtered through CP08, LP05 and CP30 and then rectified by BR01 and filtered in CP03. The rectified voltage(310VDC) is directly fed to the SMT TRP1(pin 1). The output of TRP1(pin9) is fed to the pins 4 and 5(drain input) of IP02, the SMPS Controller IC through ferritbead LP10. Switching frequency of IP02 is fixed at 100kHz. IP02 will not operate unless its supply voltage on pin7 is reached to about 12VDC. IP02 will start up and start to work when 12VDC is reached and continue to work until supply voltage decrements to about 9VDC. The voltage needed for startup is supplied from resistors RP07 and RP06, continuous voltage is from the rectifier diode DP02. Feedback is supplied from +D5V through PP01, RP01, RP05, IP03, RP03 and the optocoupler IP01. Current sink from pin2 of IP02 determines feedback so the ton/toff ratio. A protection circuit has been implemented composed of DP08, DP09, DP10, CP29, CP28, CP27, and QP04. When a decrement of voltage at seconder occurs, IP02 will try to increase ton/toff ratio and increase the seconder voltage. If a short circuit at seconder occurs, IP02 will increase ton/toff ratio too high, so the voltage at pin5 of TRP1 will go higher causing DP09 and DP10 conduct and turn on QP04. The property of IP02 is when pin2 of the IC goes down to 0VDC, it will stop operating preventing a permenant damage.



3.4 DVD Driver

3.4.1 Introduction

This document describes all features of the model DSL-600J JUMBO Loader.

- ► The Loader reads digital data stored on DVD and CD discs such as Video CD, CVD, SVCD, DVCD, CD-R, CD-RW and CD-Audio discs.
- ► DVD spec. (DVD-Book A) defines 120mm and 80mm in diameter, and single and dual layer as recording layer structure.
- ► Maximum storage capacities are 4.7Gbytes and 17.08Gbytes for single layer/single side and dual layer/double side disc respectively.
- ► Due to this high capacity, DVD is capable of storing high quality and long duration MPEG-2 moving picture data.
- ► DSL-600J can read digital data stored on DVD and Video CD family at 2 times faster than reference speed and CD-Audio discs at 8 times faster than reference speed. Also average random access time of DSL-600J is 200ms in DVD mode and 300ms in CD mode typically.
- ► The Loader offers long life and durability because the disc is read by a Laser, there by eliminating physical contact with the disc.

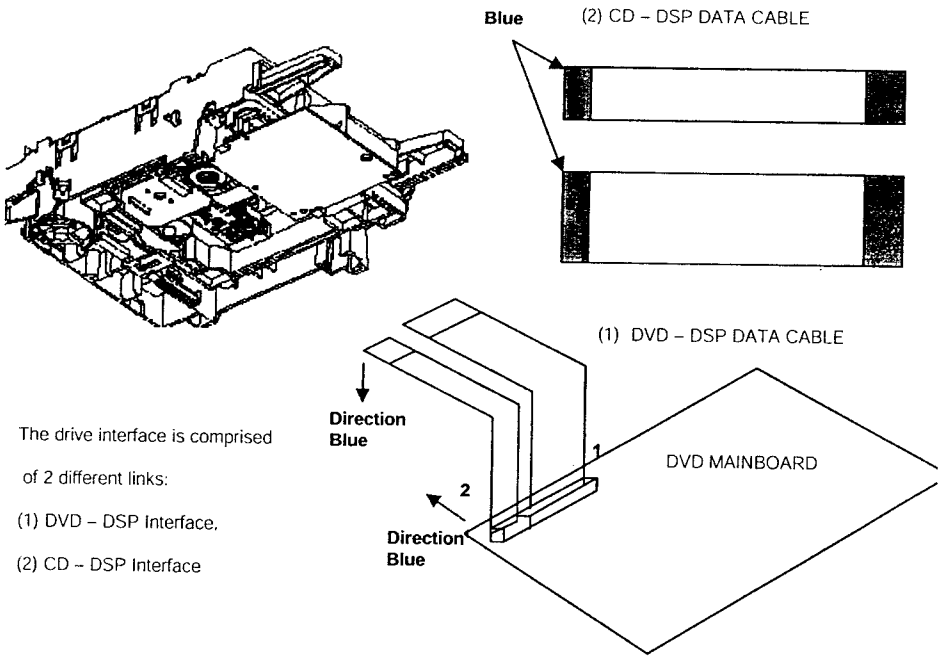
3.4.2 Electrical Characteristic

Power Voltage
+5V DC with ±5% tolerance, less than 100mVp-p Ripple Voltage
+12V DC with ±10% tolerance, less than 150mVp-p Ripple Voltage

Current (Continuous Reading)
+5V DC (Digital) 350mA (Average)
+5V DC (Analog) 250mA (Average)
+12V DC 300mA (Average)

Seeking & Spin up
+5V DC (Digital) 0.5 A (Max.)
+5V DC (Analog) 0.4 A (Max.)
+12V DC 1.5 A (Max.)

3.4.3 Connections



The drive interface is comprised of 2 different links:

(1) DVD – DSP Interface,

(2) CD – DSP Interface

4. DESCRIPTION OF THE INTEGRATED CIRCUITS

4.1 SMPS TRANSFORMER

1. GENERAL INFORMATION

Main Voltage Operations : 165Vac - 265 Vac
Main Drop-out Voltage : Max. 160 Vac
Mains Start-up Voltage : Max. 160 Vac
Operating Frequency : 95 KHz - 110 KHz

2. ELECTRICAL CHARACTERISTICS

2.1. STATIC CHARACTERISTICS

WINDING	PIN. NO	INDUCTANCE	DCB RESISTANCE
Primary Inductance	1-9	420μH ±10%	≤0.640Ω

1. Primary Leakage inductance (Pin 1-9) L ≤42 μH
2. Measurement of inductance is made of using a LCR meter at frequency of 1KHz and at out-put voltage of 1 Vms.

2.2 WITHSTANDING VOLTAGE

The transformer shall withstanding a voltage of 4 KVms for 1 minute and 1 mA between primary and secondary winding and also 2 KVms for 1 minute and 1 mA between primary winding with core and secondary winding with core.

2.3 INSULATION RESISTANCE

The insulation resistance shall be more than 500MΩ between primary and secondary windings when the applied voltage 500 Vdc for 1 minute

2.4 ELECTRICAL CHARACTERISTICS

1. Before taking measurement PP01 will be to give 5.0Vdc on 5.0Vdc line at Minimum setting of controls and a mains voltage 220 Vac.
2. Before taking a measurement, DVD set should be working at least 5 minutes on normal condition.

4.2 FRONT PANEL DRIVER IC FOR VTR (BU2872AK)

4.2.1 General Description

Operating Supply Voltage Range (TA= 25°C, VSS= 0V)

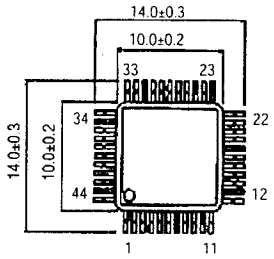
Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Supply Voltage range 1	V_{DD}	4.5	5.0	5.5	V
Operating Supply Voltage range 2	V_{EE}	VEE - 32	VEE - 30	VEE - 0	V

Absolute maximum ratings (Ta =25°C, VSS= 0 V,)

Parameter	Symbol	Limits	Unit
Applied voltage 1	V_{DD}	-0.3 ~ 7.0	V
Applied voltage 1	V_{EE}	VDD+0.3 ~ VDD -35	V
Input Voltage	V_{IN}	-0.3 ~ VDD +0.3	V
Power dissipation	P_D	850**	mW
Operating Temperature	T_{OPR}	-25~75	℃
Storage Temperature	T_{STG}	-55~125	℃

Pin Description

Pin	Name	Pin No.	I/O	Function
VDD	Power supply pin 1	14, 38	I	Connected to the power supply of the system
OSC	Oscillation pin	44	I/O	Connected to the oscillation capacitor
VSS	GND pin	7, 43	I	Connected to the ground of the system
SI	Serial data input	6	I	Serial data input starting from MSB
SO	Serial data output	5	O	Serial data output starting from MSB
SCK	Serial Clock input	8	I	Serial data read at rising edge
CS	Serial Chip select	9	I	Serial initialization at "L", effective at "H"
S1~S11	High with standing voltage output pin for segment	15~25	O	Output pin for segment Output: Pch open drain + pull – down resistance
VEE	Power supply pin 2	27	I	Pull – down resistance connection for FLP driver
G1~G6	High with standing voltage output pin for grid	37~ 32	O	Output pin for grid Output: Pch open drain + pull – down resistance
S12/G11~S16/ G7	High with standing voltage output pin for segment / grid	26, 28~31	O	Segment / grid output selectable pin Output: Pch open drain + pull – down resistant
L1~L4	Output pin for LED	42~39	O	Output pin for LED; output is CMOS output
K1~K4	Key data input pin	10~13	I	Data input pin for key scanning
SW1~SW4	General – purpose input pin	1~4	I	General – purpose input pin Input data sent to microcomputer in serial format



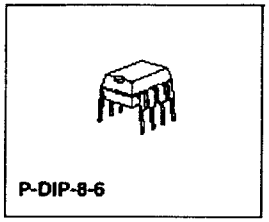
4.3 SMPS CONTROLLER IC (TDA 16831)

TA=70°C

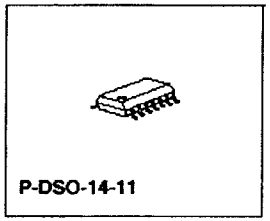
Overview

Features

- PWM controller + sense CoolMOS attached in one compact package
- 600 V avalanche rugged CoolMOS
- Typical R_{DSon} = 0.5 ... 3.5Ω at T_j= 25°C
- Only 4 active Pins
- Standard DIP-8 Package for output Power ≤ 40 W
- Only few external components required
- Low start up current
- Current mode control
- Input Undervoltage Lockout
- Max. Duty Cycle limitation
- Thermal Shutdown
- Modulated Gate Drive for low EMI

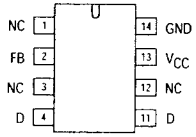


P-DIP-8-6



P-DSO-14-11

Pin Configuration



Pin Description

Pin	Symbol	Function
1	NC	Not Connected
2	FB	PWM Feedback. input
3	NC	Not Connected
4	D	600 V Drain CoolMOS
5	D	600 V Drain CoolMOS
6	NC	Not Connected
7	V_{CC}	PWM Supply Voltage
8	GND	PWM GND and Source of CoolMOS

ELECTRICAL CHARACTERISTICS

Absolute maximum ratings

Parameter	Symbol	Limit Values		Unit	Remarks
		Min.	max.		
Supply Voltage	V_{CC}	-0.3	V_Z	V	Zener Voltage [1] page 11
Supply + Zener Current	I_{CCZ}	0	20	mA	Beware of P_{max} [2]
Drain Source Voltage	V_{DS}	600	-	V	-
Avalanche Current	I_{AC}	-	Icsthmax	V	t= 100ns
Voltage at FB	V_{FB}	-0.3	5.5	V	-
Junction Temperature	T_j	-40	150	°C	-
Storage Temperature	T_{stg}	-50	150	°C	-
Thermal Resistance System-Air	R_{thSA}	-	90	K/W	P-DIP-8-6
	R_{thSA}	-	125	K/W	P-DSO-14-11

1) Be aware that VCC capacitor is discharged before IC is plugged into the application board.
2) Power dissipation should be observed

Operating Range

Parameter	Symbol	Limit Values		Unit	Remarks
		Min.	max.		
Supply Voltage	V_{CC}	V_{CCH}	V_Z	V	-
Junction Temperature	T_j	-25	120	°C	-

4.4 SMPS PROGRAMMABLE SHUNT REGULATOR (FAIRCHIELD TL 431)

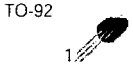
Features

- Programmable output voltage to 36 volts
- Low dynamic output impedance 0.20 typical
- Sink current capability of 1.0 to 100 mA
- Equivalent full-range temperature coefficient of 50 ppm °C typical
- Temperature compensated for operation over full rated operating temperature range
- Low output noise voltage
- Fast turn-on response

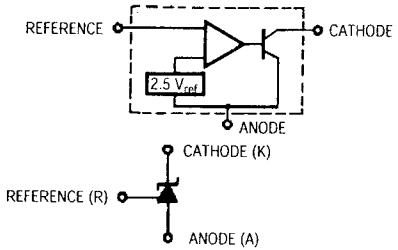
Description

The TL 431/TL 431A are three-terminal adjustable regulator series with a guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between V_{REF} (approximately 2.5 volts) and 36 volts with two external resistors. These devices have a typical dynamic output impedance of 2.0W Active output circuity provides a very sharp turn-on characteristic making these devices excel lent replacement for zener diodes in many applications

TO-92



1. Ref 2. Arode 3. Cathode



Absolute maximum ratings

Parameter	Symbol	Value	Unit
Cathode voltage	V_{KA}	37	V
Cathode current Range (Continuous)	I_{KA}	-100 ~ +150	mA
Reference Input Current Range	I_{REF}	0.05 ~ +10	mA
Power dissipation D, Z Sffix Package N Suffix Package	P_D	 770 1000	 mW mW
Operating Temperature Range	T_{OPR}	-25 ~ +85	℃
Storage Temperature Range	T_{STG}	-65 ~ +150	℃

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Cathode Voltage	V_{KA}	V_{REF}	-	36	V
Cathode Current	I_{KA}	1.0	-	100	mA

4.5 LINE FILTER (2 X 6.8 mH)

ELECTRICAL DATA

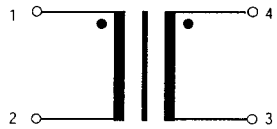
Inductance: $L_{1-2} = L_{3-4} = 6.8$ mH - 15% - +20%

Resistance: $R_{1-2} = R_{3-4} = 0.45$ ohm (max)

Rated current: Irms = 0.50 A

(F= 1 KHz V= 1 Vms)

CIRCUIT DIAGRAM

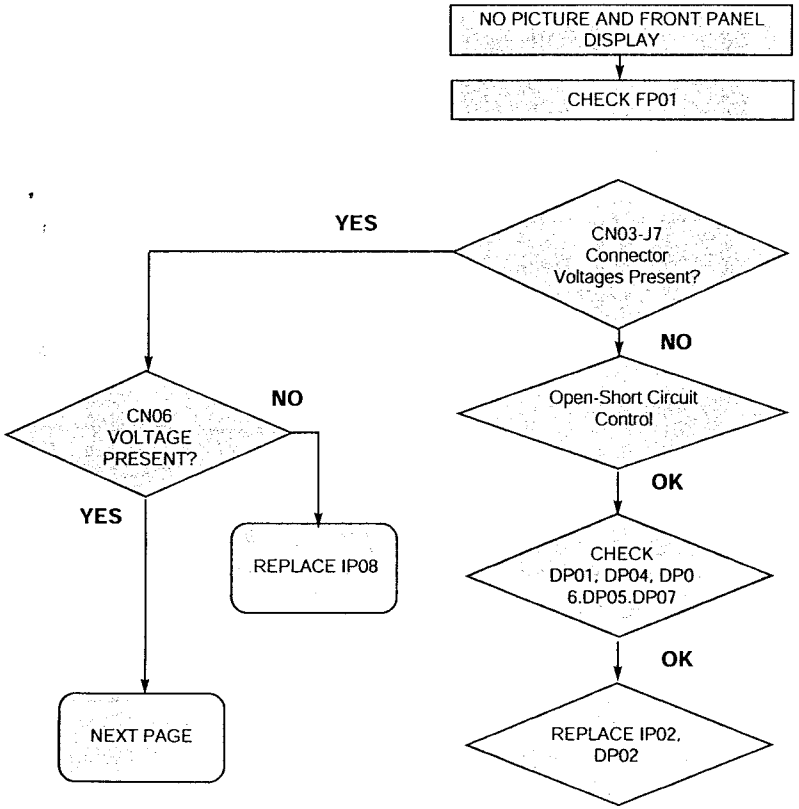


LEAKAGE INDUCTANCE

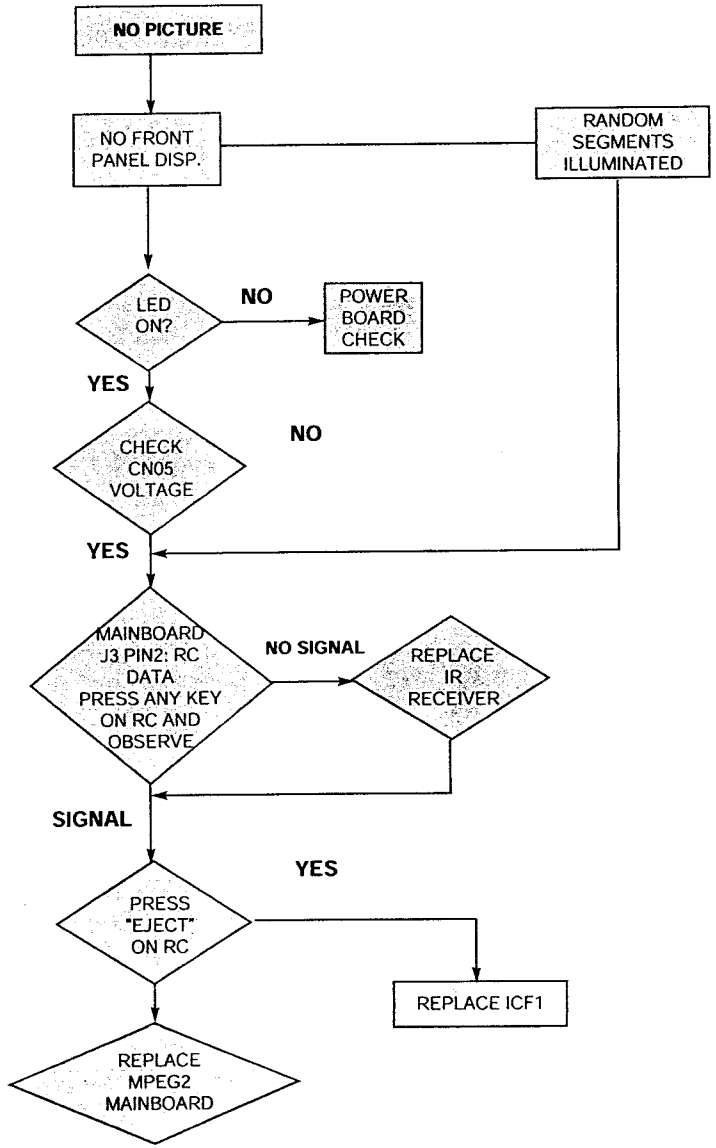
$L_{1-2} = L_{3-4} =$ 100 ± %20 µH NOTES

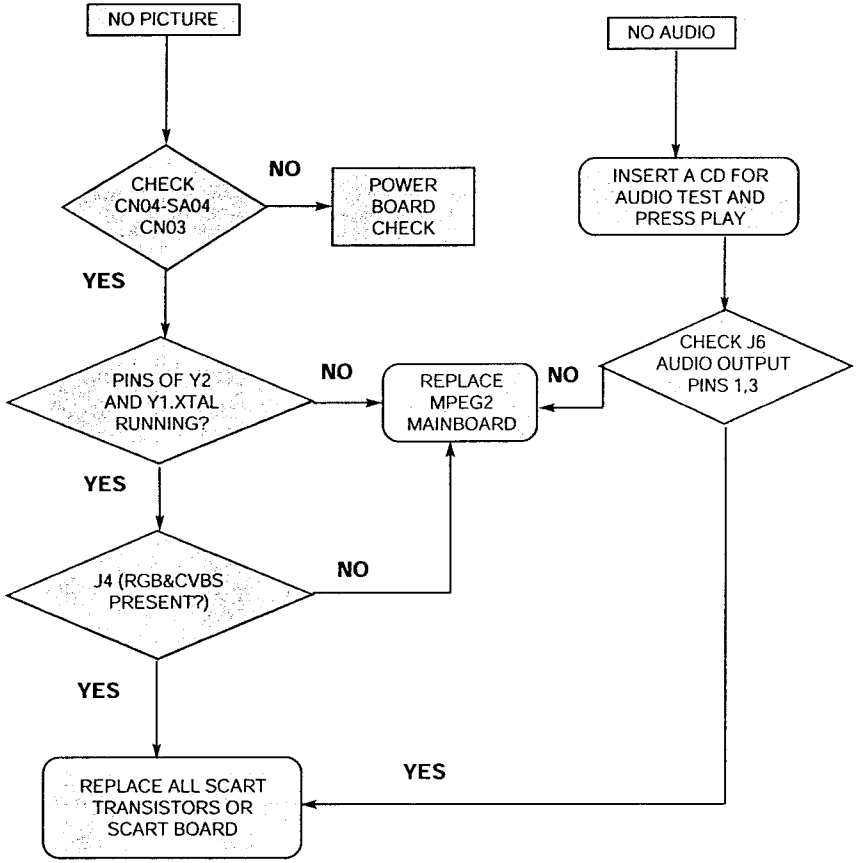
5. FAULT TRACING FLOW CHART

5.1 POWER SUPPLY



5.2 MAIN BOARD AND FRONT PANEL





COMPONENT LIST

CABLE

POS NO	TELRA CODE	DESCRIBTION
	002000060060	SCRT TO SCRT 120CM
	002020511030	7*0.20 BLACK
	002000060070	CHICH TO CHICH 3'LU 120 CM
	002020000010	20P 1MM FFC 18CM
	002022000021	2P*2SKT.25CM
	002028000010	28P 1MM FFC 19CM
	002032000010	3P*2SKT.30CM
	002032000020	3P*2SKT.25CM
	002052000310	5P*2SKT 20CM
	002072000111	7P*2SKT 20CM
	002072000181	6P*2SKT 40CM.
	002072000201	6P*2SKT 40CM 2MM
	002081000300	8P*2SKT.45CM
	002528586261	POWER 220CM DVD

POWER (W/O HEADPHONE)

POS NO	TELRA CODE	DESCRIBTION
CP11	040071041041	CAP CER 100NF 50V +80-20
CP14	040071041041	CAP CER 100NF 50V +80-20% F
CP19	040071041041	CAP CER 100NF 50V +80-20% F
CP21	040071041041	CAP CER 100NF 50V +80-20% F
CP22	040071041041	CAP CER 100NF 50V +80-20% F
CP24	040071041041	CAP CER 100NF 50V +80-20% F
CP12	040052172221	CAP CER 2.2NF 2KV 20% B
CP10	620004072241	CAP MKT 220NF 63V 10% 5MM
CP20	620004072241	CAP MKT 220NF 63V 10% 5MM
CP26	620004072241	CAP MKT 220NF 63V 10% 5MM
CP35	620004072241	CAP MKT 220NF 63V 10% 5MM
CP37	620004072241	CAP MKT 220NF 63V 10% 5MM
CP47	620004072241	CAP MKT 220NF 63V 10% 5MM
CP06	040040042211	CAP CER 220PF 50V 10% SL
CP51	040040042211	CAP CER 220PF 50V 10% SL
CP23	040040042251	CAP CER 22NF 50V 10% B
CP05	042440251081	CAP ELECT 1000MF 25V 20%
CP13	042440251081	CAP ELECT 1000MF 25V 20%
CP18	042440251081	CAP ELECT 1000MF 25V 20%
CP49	042440251081	CAP ELECT 1000MF 25V 20%
CP15	042416351081	CAP ELECT 1000MF 35V 20% RSS
CP36	042416351081	CAP ELECT 1000MF 35V 20% RSS
CP03	042719901071	CAP ELECT 100MF400V20% SNAP-IN
CP28	042446501061	CAP ELECT 10MF 50V 20%
CP09	042449254771	CAP ELECT 470MF 25V 20%
CP04	042414254761	CAP ELECT 47MF 25V 20%
CP25	042448504761	CAP ELECT 47MF 50V 20%
CP30	620005141041	CAP MKT 100NF 275VAC 20% RFIX2
CP16	620013081041	CAP MKT 100NF 63V 5% 5MM

POS NO	TELRA CODE	DESCRIBTION
CP27	621003003331	CAP MKT 33NF 100V 5% 5MM
CP29	618014014741	CAP MKT 470NF 63V 10% 5MM
CP08	621014064741	CAP MKT 470NF 275VAC 10% 10MM
CP07	040258764721	CAPCER 4.7NF 400VAC 20% 4KV SFYX1Y1 8532.23.11
LP01	608000000251	COIL 10UH 1.5A 5%
LP06	608000000221	COIL 10UH 5% 0.41A AXIAL FIXED
LP04	608000000261	COIL 6UH 1.5A 5%
LP10	608780002411	COIL FILTER 3.5*9*0.8 F.BEAD
LP11	608780002411	COIL FILTER 3.5*9*0.8 F.BEAD
LP12	608780002411	COIL FILTER 3.5*9*0.8 F.BEAD
LP13	608780002411	COIL FILTER 3.5*9*0.8 F.BEAD
LP14	608780002411	COIL FILTER 3.5*9*0.8 F.BEAD
LP15	608780002411	COIL FILTER 3.5*9*0.8 F.BEAD
CN02	075030261010	CONN 2P VRT W/LOCK10MM NONFLAM
CN06	075030311061	CONN 6P IN-LINE VRT 2MM
CN05	075030311040	CONN 7P IN-LINE VRT W/LOCK
CN03	075030311050	CONN 8P IN-LINE VRT W/LOCK
CN04	075030211011	CONN.2P IN -LINE VERTICAL
DP03	048110411031	DIODE 1N4937
BR01	048110411071	DIODE BRG.B380 C1500
DP04	048110411041	DIODE BYW98-200
DP02	048210411001	DIODE GP.1N4148 DO-35
DP08	048210411001	DIODE GP.1N4148 DO-35
DP01	048110411061	DIODE MBR1045
DP05	048110411051	DIODE UF4003
DP06	048110411051	DIODE UF4003
DP07	048110411051	DIODE UF4003
DP10	048542613621	DIODE ZNR. 7V5 ZPD DO-35
DP09	048542613621	DIODE ZNR. 7V5 ZPD DO-35
FP01	075110211030	FUSE HOLDER TK-79/B BLACK
FP01	067420001811	FUSE 3.15A 250V TIME-LAG 8536.10.11
IP08	045238103051	IC LM317 1.5A ADJ V REG TO-220
IP01	045038362811	IC TCDT1101 OPTOCUPLER
IP02	045100000151	IC TDA16833 SMPS CONTROLLER
IP03	045198000011	IC TL431CLP REGULATOR
LP05	608980003721	LINE FILTER 2*75mH Elf-18D615
1PCB	614099090510	PCB(99TA051I)DVD POWER
RP19	030020615231	RESISTOR C.F 1.5K 1/4W 5%
RP25	030020610231	RESISTOR C.F 1K 1/4W 5%
RP06	030020610411	RESISTOR C.F 100K 1/4W 5%
RP07	030020610411	RESISTOR C.F 100K 1/4W 5%
RP01	030020610331	RESISTOR C.F 10K 1/4W 5%
RP05	030020610331	RESISTOR C.F 10K 1/4W 5%
RP13	030020610331	RESISTOR C.F 10K 1/4W 5%
RP21	030020647911	RESISTOR C.F 4.7R 1/4W 5%
RP08	030020615011	RESISTOR C.F 15R 1/4W 5%
RP09	030020622011	RESISTOR C.F 22R 1/4W 5%
RP11	030020633231	RESISTOR C.F 3.3K 1/4W 5%
RP23	030020633231	RESISTOR C.F 3.3K 1/4W 5%
RP03	030020633131	RESISTOR C.F 330R 1/4W 5%
RP12	030020639131	RESISTOR C.F 390R 1/4W 5%
RP18	030050647511	RESISTOR C.F 4.7M 1/2W 5% SFTY

POS NO	TELRA CODE	DESCRIBTION
RP26	030050647021	RESISTOR C.F. 47R 1/2W 5%
RP02	030020656231	RESISTOR C.F 5.6K 1/4W 5%
RP10	030108647311	RESISTOR M.O 47K 1W 5%
RP22	030020675011	RESISTOR C.F 75R 1/4W 5%
DP01	013090043490	DVD SMPS A3 CM2
TRP1	602470003441	TRF.SMPS E32/16/9 N27
PP01	611110022221	TRIMPOT 2.2K 0.1W 30% V-ADJ5/5 8533.40.19
QP01	046246022281	TRS.BC547B TO-92
QP03	046246022281	TRS.BC547B TO-92
QP04	046246022281	TRS.BC547C TO-92

FRONT (W/O SHUTTLE)

POS NO	TELRA CODE	DESCRIBTION
CF01	040067041081	CAP CER 100NF 50V 20% Z5U 0805
CF02	040067041081	CAP CER 100NF 50V 20% Z5U 0805
CF05	040067041081	CAP CER 100NF 50V 20% Z5U 0805
CF11	040732041081	CAP CER 100PF 50V 5% COG 0805
CF08	040052044681	CAP CER 47PF 50V 5% COG 0805
CF09	040052044681	CAP CER 47PF 50V 5% COG 0805
CF10	040052044681	CAP CER 47PF 50V 5% COG 0805
CF04	042416502261	CAP ELECT 22MF 50V 20%
CF07	042416502261	CAP ELECT 22MF 50V 20%
SF02	075100611551	CONN 6P INLINE HRZ W/LOCK2.5MM
SF01	075100611561	CONN 7P INLINE HRZ W/LOCK2.5MM
DF01	048210411001	DIODE GP.1N4148 DO-35
DF02	048210411001	DIODE GP.1N4148 DO-35
DF03	048210411001	DIODE GP.1N4148 DO-35
DF04	048210411001	DIODE GP.1N4148 DO-35
DF05	048210411001	DIODE GP.1N4148 DO-35
DF06	048110411011	DIODE LED LTL-30EFJ BICOLOR
DF07	048113229071	DIODE ZNR.5V1 BZV55C SOD80 MMF
DSP1	399915500291	DISPLAY VFD DVD (FLORESAN)
ICF1	045000002661	IC PT6312 VFD DRIVER (PTC)
1PCB	614099030500	PCB(99TA050C)DVD FRONT
IR01	609330001171	PREAMPLIFIER TSOP1138
JF02	030140610101	RESISTOR C.F 100R 1/6W 5%
RF01	030010610381	RESISTOR C.F 10K 1/8W 5% 0805
RF02	030010610381	RESISTOR C.F 10K 1/8W 5% 0805
RF03	030010610381	RESISTOR C.F 10K 1/8W 5% 0805
RF04	030010610381	RESISTOR C.F 10K 1/8W 5% 0805
RF05	030010610381	RESISTOR C.F 10K 1/8W 5% 0805
RF06	030010610381	RESISTOR C.F 10K 1/8W 5% 0805
RF07	030010610381	RESISTOR C.F 10K 1/8W 5% 0805
RF08	030010610381	RESISTOR C.F 10K 1/8W 5% 0805
RF09	030010610281	RESISTOR C.F 1K 1/8W 5% 0805
RF11	030010610981	RESISTOR C.F 1R 1/8W 5% 0805
RF13	030010627381	RESISTOR C.F 27K 1/8W 5% 0805
RF12	030010647281	RESISTOR C.F 4.7K 1/8W 5% 0805

POS NO	TELRA CODE	DESCRIBTION
RF10	030010647181	RESISTOR C.F 470R 1/8W 5% 0805
RF14	030140651361	RESISTOR C.F 51K 1/10W 5% 0603
SW01	081101114031	SWITCH TACT SKHHPM W/GRAUND5MM
SW02	081101114031	SWITCH TACT SKHHPM W/GRAUND5MM
SW03	081101114031	SWITCH TACT SKHHPM W/GRAUND5MM
SW04	081101114031	SWITCH TACT SKHHPM W/GRAUND5MM
SW05	081101114031	SWITCH TACT SKHHPM W/GRAUND5MM
SW06	081101114031	SWITCH TACT SKHHPM W/GRAUND5MM
SW07	081101114031	SWITCH TACT SKHHPM W/GRAUND5MM
SW08	081101114031	SWITCH TACT SKHHPM W/GRAUND5MM
SW09	081101114031	SWITCH TACT SKHHPM W/GRAUND5MM
SW10	081101114031	SWITCH TACT SKHHPM W/GRAUND5MM
SW11	081101114031	SWITCH TACT SKHHPM W/GRAUND5MM
QF01	046000000101	TRS. 2N3904 TO-92
QF02	046000000111	TRS.2N4126 TO-92
DSP1	004537000020	CFT DVD
IR01	004537000020	BANT CFT DVD

SCART

POS NO	TELRA CODE	DESCRIBTION
CA04	040071041041	CAP CER 100NF 50V +80-20% F
CA01	040040043311	CAP CER 330PF 50V 10% B
CA02	040040043311	CAP CER 330PF 50V 10% B
CA03	042414164761	CAP ELECT 47MF 16V 20%
CA05	042414164761	CAP ELECT 47MF 25V 20%
CA06	042414164761	CAP ELECT 47MF 25V 20%
CA07	042414164761	CAP ELECT 47MF 25V 20%
CA08	042414164761	CAP ELECT 47MF 25V 20%
CA09	042414164761	CAP ELECT 47MF 25V 20%
CA10	042414164761	CAP ELECT 47MF 25V 20%
LA01	608980000101	COIL 12UH 5% 0.15A AXIAL FIXED
LA02	608980000101	COIL 12UH 5% 0.15A AXIAL FIXED
SA01	075030311021	CONN 3P IN-LINE VRT W/LOCK
SA03	075030311021	CONN 3P IN-LINE VRT W/LOCK
SA02	075030511001	CONN 5P IN-LINE VRT W/LOCK
SA04	075030211011	CONN.2P IN -LINE VERTICAL
1PCB	614099030540	PCB(99TA054C)DVD SCART
RA18	030140610311	RESISTOR C.F 10K 1/6W 5%
RA19	030140610311	RESISTOR C.F 10K 1/6W 5%
RA04	030140615121	RESISTOR C.F 150R 1/6W 5%
RA03	030140610201	RESISTOR C.F 1K 1/6W 5%
RA08	030140610201	RESISTOR C.F 1K 1/6W 5%
RA11	030140610201	RESISTOR C.F 1K 1/6W 5%
RA14	030140610201	RESISTOR C.F 1K 1/6W 5%
RA20	030140610201	RESISTOR C.F 1K 1/6W 5%
RA23	030140610201	RESISTOR C.F 1K 1/6W 5%
RA28	030140622101	RESISTOR C.F 220R 1/6W 5%
RA10	030140622311	RESISTOR C.F 22K 1/6W 5%
RA13	030140622311	RESISTOR C.F 22K 1/6W 5%

POS NO	TELRA CODE	DESCRIBTION
RA16	030140622311	RESISTOR C.F 22K 1/6W 5%
RA21	030140647211	RESISTOR C.F 4.7K 1/6W 5%
RA24	030140647211	RESISTOR C.F 4.7K 1/6W 5%
RA25	030140647211	RESISTOR C.F 4.7K 1/6W 5%
RA22	030140647311	RESISTOR C.F 47K 1/6W 5%
RA29	030140656011	RESISTOR C.F 56R 1/6W 5%
RA09	030140675011	RESISTOR C.F 75R 1/6W 5%
RA12	030140675011	RESISTOR C.F 75R 1/6W 5%
RA15	030140675011	RESISTOR C.F 75R 1/6W 5%
RA17	030140675011	RESISTOR C.F 75R 1/6W 5%
RA26	030140675011	RESISTOR C.F 75R 1/6W 5%
RA27	030140675011	RESISTOR C.F 75R 1/6W 5%
RA30	030140675011	RESISTOR C.F 75R 1/6W 5%
SA05	075040210051	SOCKET SCART 27'/28'/32'COMMON
QA01	046246022281	TRS.BC547B TO-92
QA02	046246022281	TRS.BC547B TO-92
POS NO	TELRA CODE	DESCRIBTION
QA03	046246022281	TRS.BC547B TO-92
QA04	046246022281	TRS.BC547B TO-92
QA05	046246022281	TRS.BC547B TO-92
QA06	046246022281	TRS.BC547B TO-92

CONTENTS

	PAGE
1. Title Page	4
2. Board Size	5
3. SWAN ES4408 DVD Processor	6
4. ROM, SDRAM, SRAM & ROM Emulator	7
5. DVD Loader Atapi Interface	8
6. Clock Circuit	9
7. Video / Audio Encoder	10
8. Power Suplly	11
12. Power	12
13. 2 Channel Audio Out	13
14. VCD Board	14
15. DVD MPEG Board	15
16. SPEC Confirmation	19
17. Interface	21

ESS2CH1 FOR CS4340 &AV3168/9
ESS ES4318 DVD BOARD

PAGE

1 INDEX
2 BOARD SIZE
3 SWAN ES4318 CHIP
4 MEMORY - SDRAM & ROM
5 DVD DRIVE INTERFACE
6 CLOCK CIRCUIT
7 VIDEO/AUDIO ENCODER
8 POWER SUPPLY
9 2 Channel Audio out

SWAN ES4318

LCEx#	FUNCTION
0	
1	I/O EXPAND
2	I/O EXPAND
3	ROM/FLASH

AUXx	FUNCTION
0	I2C DATA
1	I2C CLOCK
2	VFD DATA
3	DCI RXD / AV3168/9 MODE
4	INTERRUPT
5	DCI TXD / AV3168/9 RST#
6	VFD CS#
7	VFD CLK

GROUND

NAME	TYPE
GND	DIGITAL AND VIDEO GROUND
AGND	AUDIO GROUND

POWER

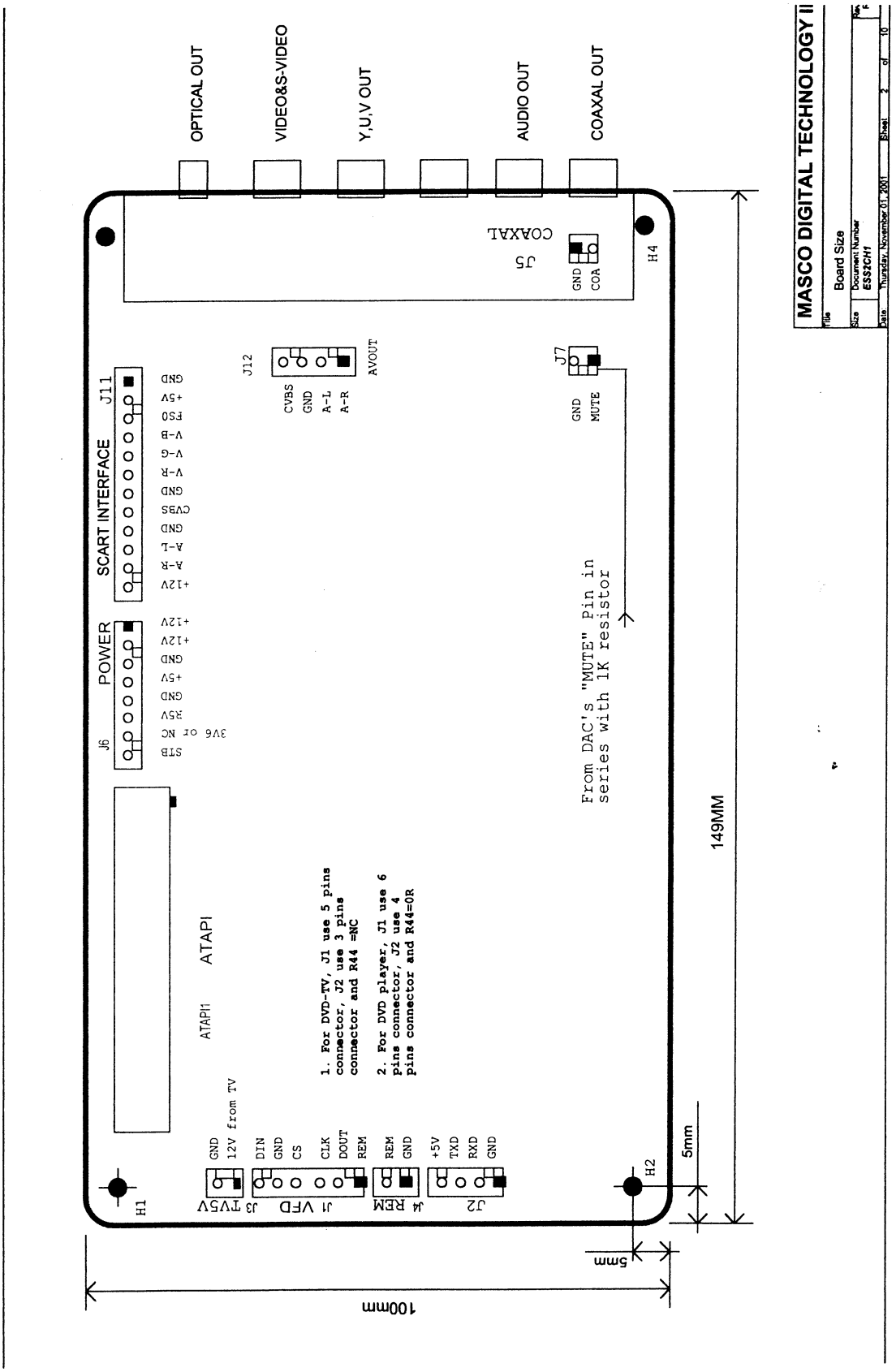
NAME	TYPE	DEVICE
+5V	DIGITAL 5V	SUPPLY
VCC3	DIGITAL 3.6V	ES4318, SDRAM
VCC25	DIGITAL 2.5V	ES4318

THE INFORMATION HAS BEEN CHECKED AND IS BELIEVED TO BE RELIABLE. HOWEVER, NO RESPONSIBILITY IS ASSUMED FOR INNACCURACIES. CIRCUIT DIAGRAMS ARE PROVIDED AS A MEANS OF ILLUSTRATING TYPICAL APPLICATIONS; CONSEQUENTLY COMPLETE INFORMATION FOR CONSTRUCTION PURPOSES IS NOT NECESSARILY GIVEN. ESS RESERVES THE RIGHT TO MAKE CHANGES AT ANY TIME IN ORDER TO IMPROVE THE DESIGN.

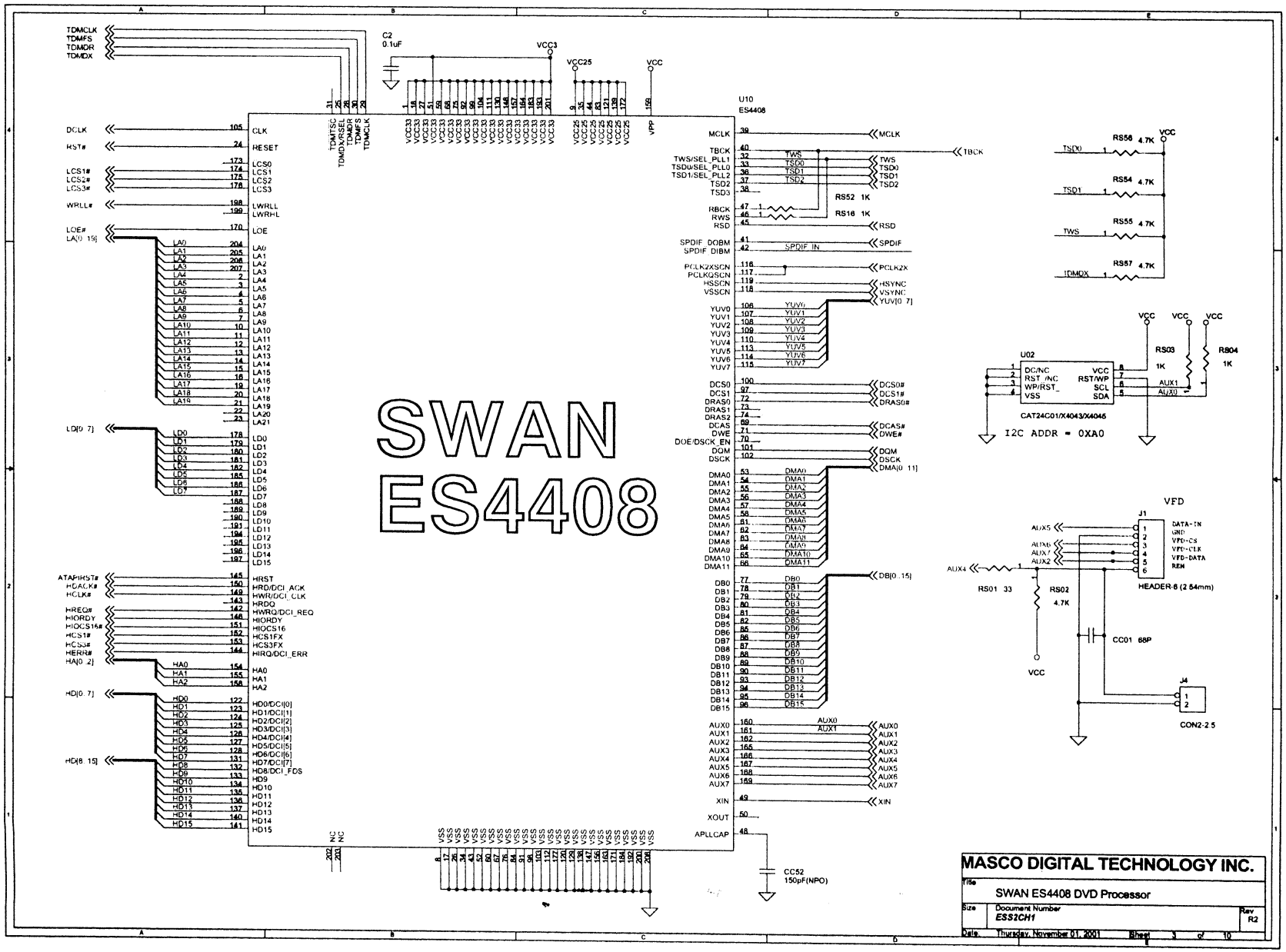
MASCO DIGITAL TECHNOLOGY INC.

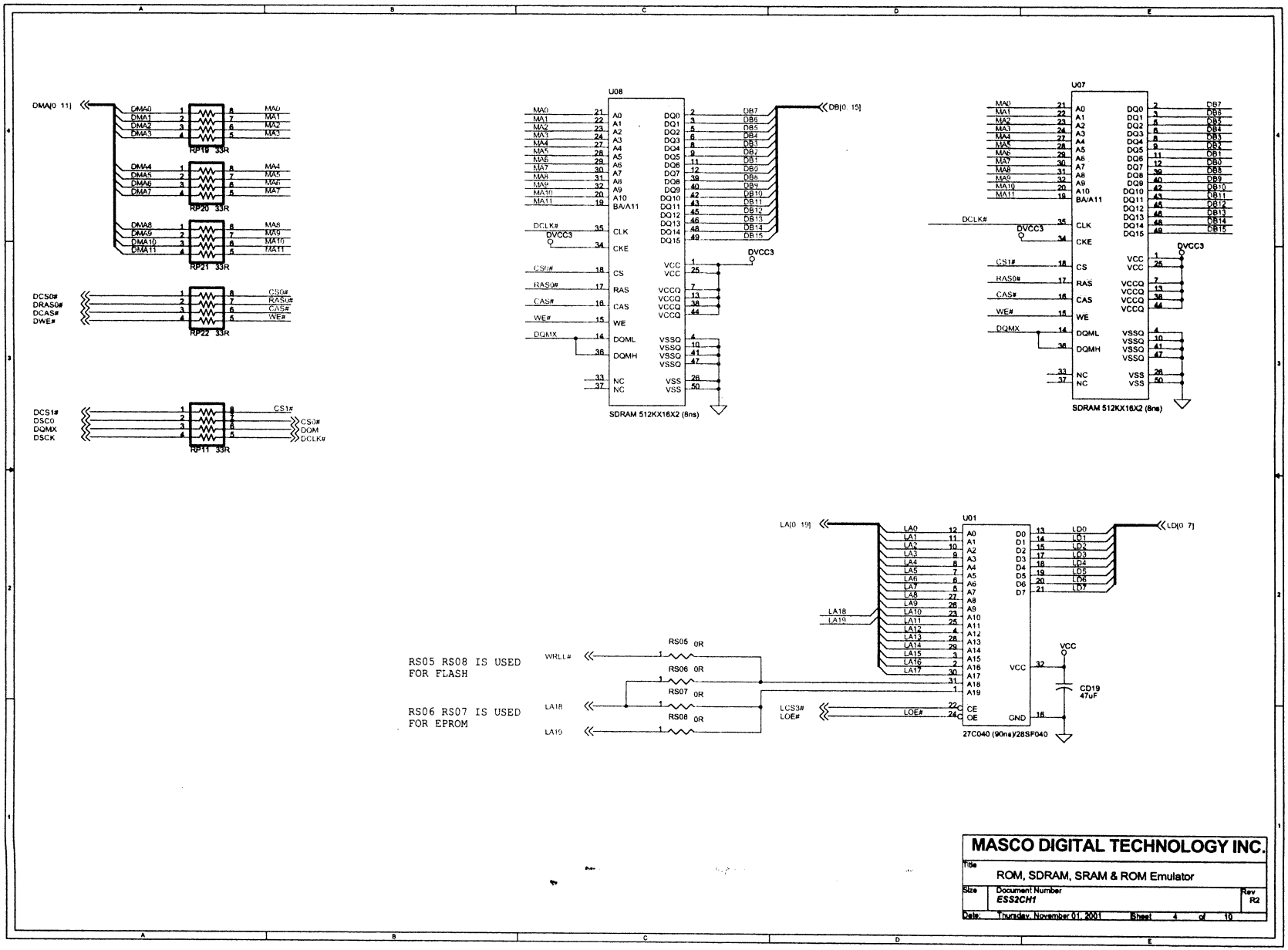
Title: Title Page		
Size	Document Number: ESS2CH1	Rev: R2
Date: Thursday, November 01, 2001	Sheet 1 of 10	

BOARD SIZE


OPTICAL OUT
VIDEO&S-VIDEO
Y,U,V OUT
AUDIO OUT
COAXAL OUT
MASCO DIGITAL TECHNOLOGY II
Board Size
Document Number
ESS2CH1
Thursday, November 01, 2001
J5 COAXAL
GND COA
H4
J12
CVBS GND A-L A-R
AVOUT
J7
GND MUTE
J11 SCART INTERFACE
GND +5V FSO V-B V-G V-R GND CVBS GND A-L A-R +12V
J6 POWER
STB 3V6 or NC 3SV GND +5V GND +12V +12V
From DAC's "MUTE" Pin in series with 1K resistor
ATAPI1 ATAPI
1. For DVD-TV, J1 use 5 pins connector, J2 use 3 pins connector and R44 =NC
2. For DVD player, J1 use 6 pins connector, J2 use 4 pins connector and R44=OR
GND 12V from TV
J3 TV5V
DIN GND CS CLK DOUT REM
J1 VFD
REM GND
J4 REM
+5V TXD RXD GND
J2
H1
H2
149MM
5mm
5mm
100mm

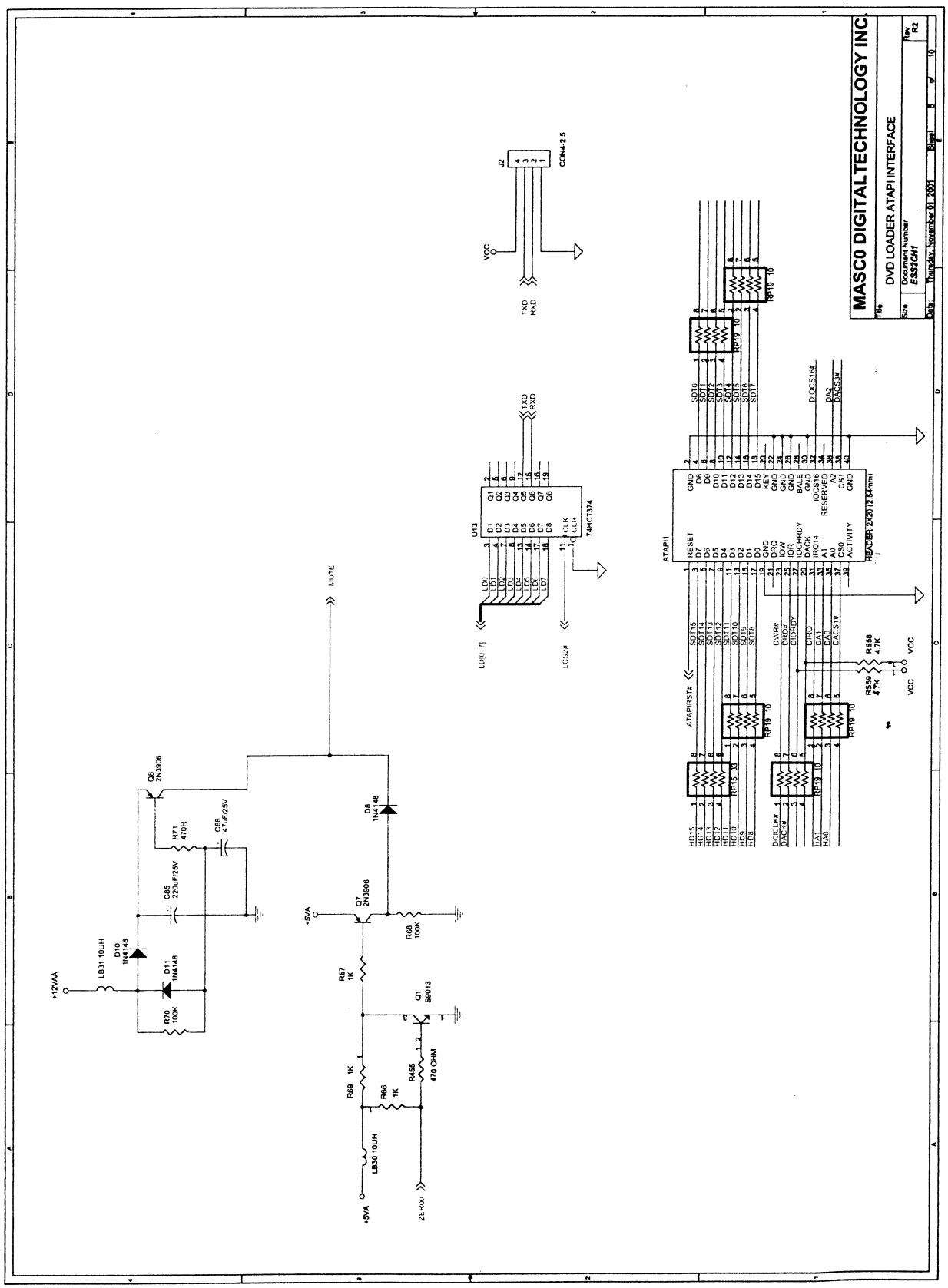
SWAN ES4408 DVD PROCESSOR



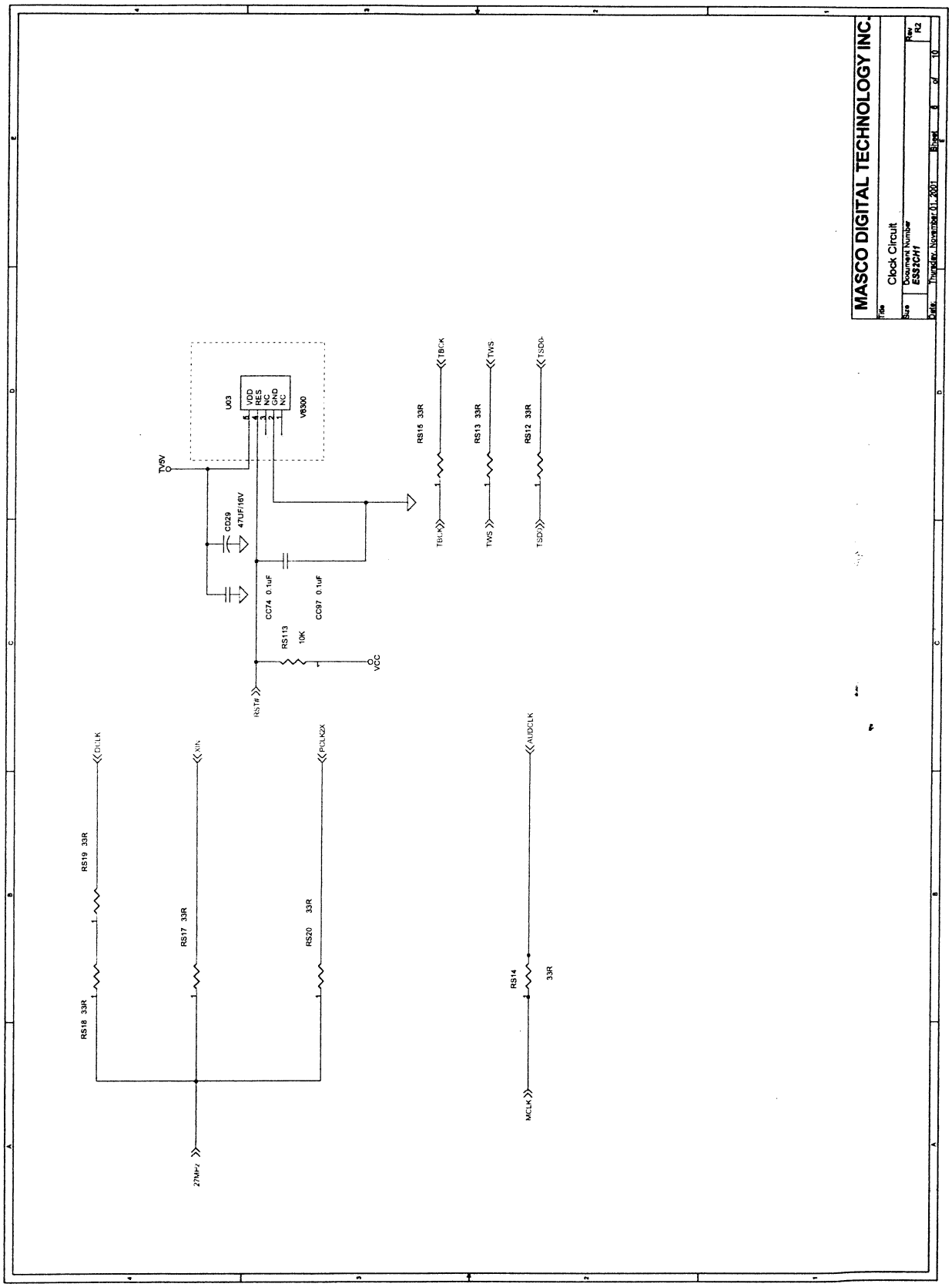


MASCO DIGITAL TECHNOLOGY INC.		
Title: ROM, SDRAM, SRAM & ROM Emulator		
Size	Document Number: ESS2CH1	Rev: R2
Date: Thursday, November 01, 2001	Sheet 4 of 10	

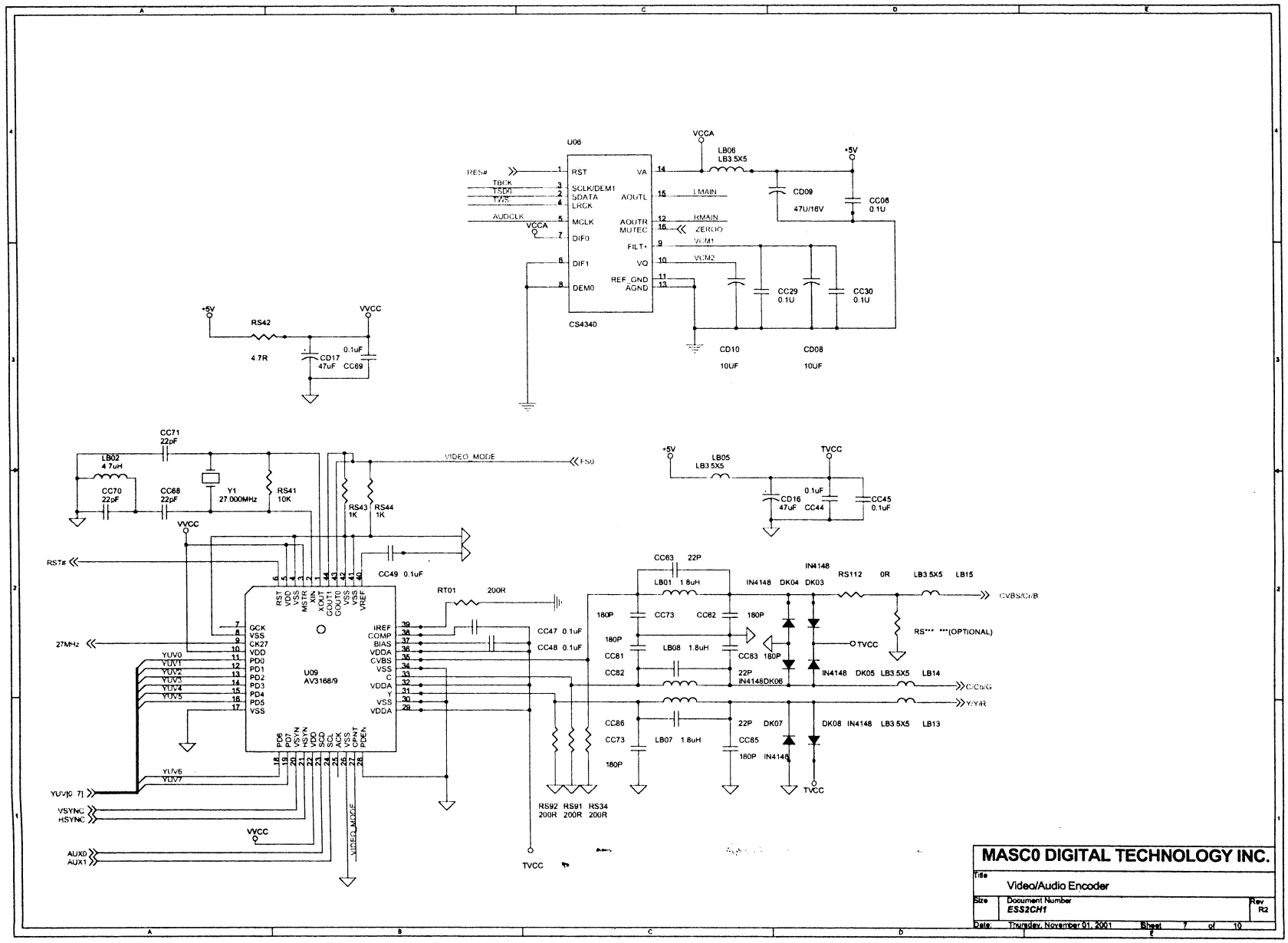
DVD LOADER ATAPI INTERFACE



CLOCK CIRCUIT

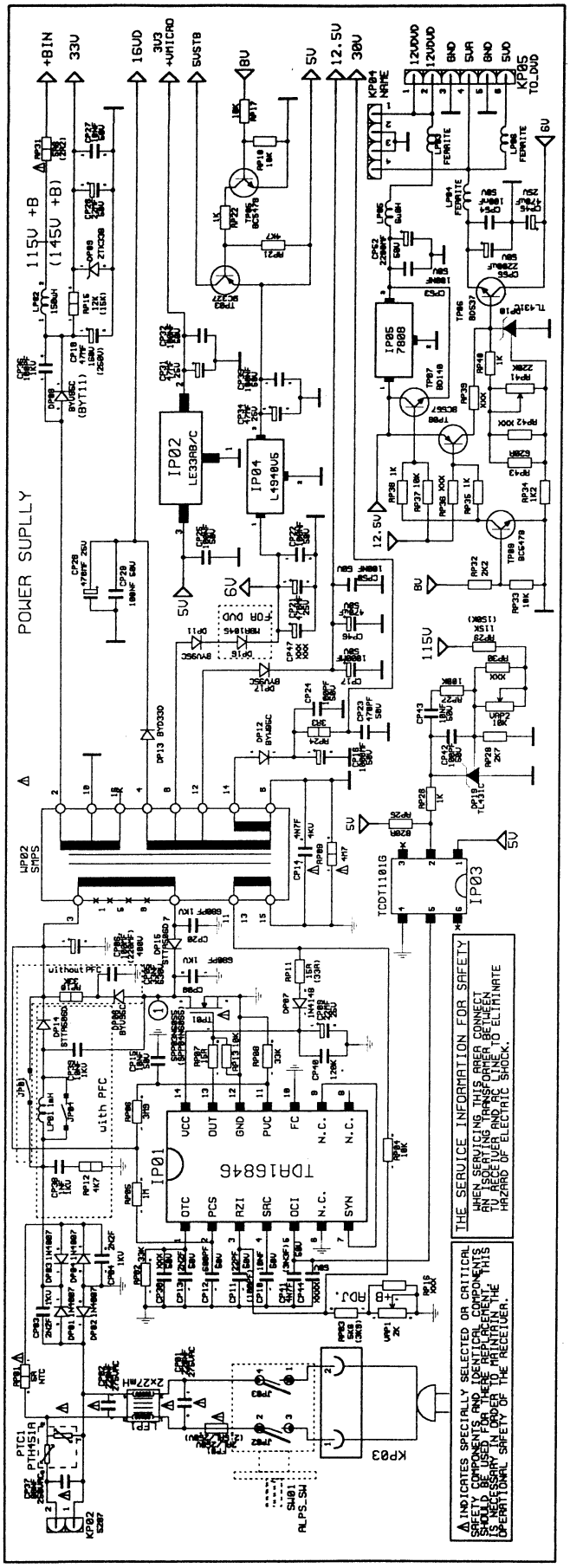


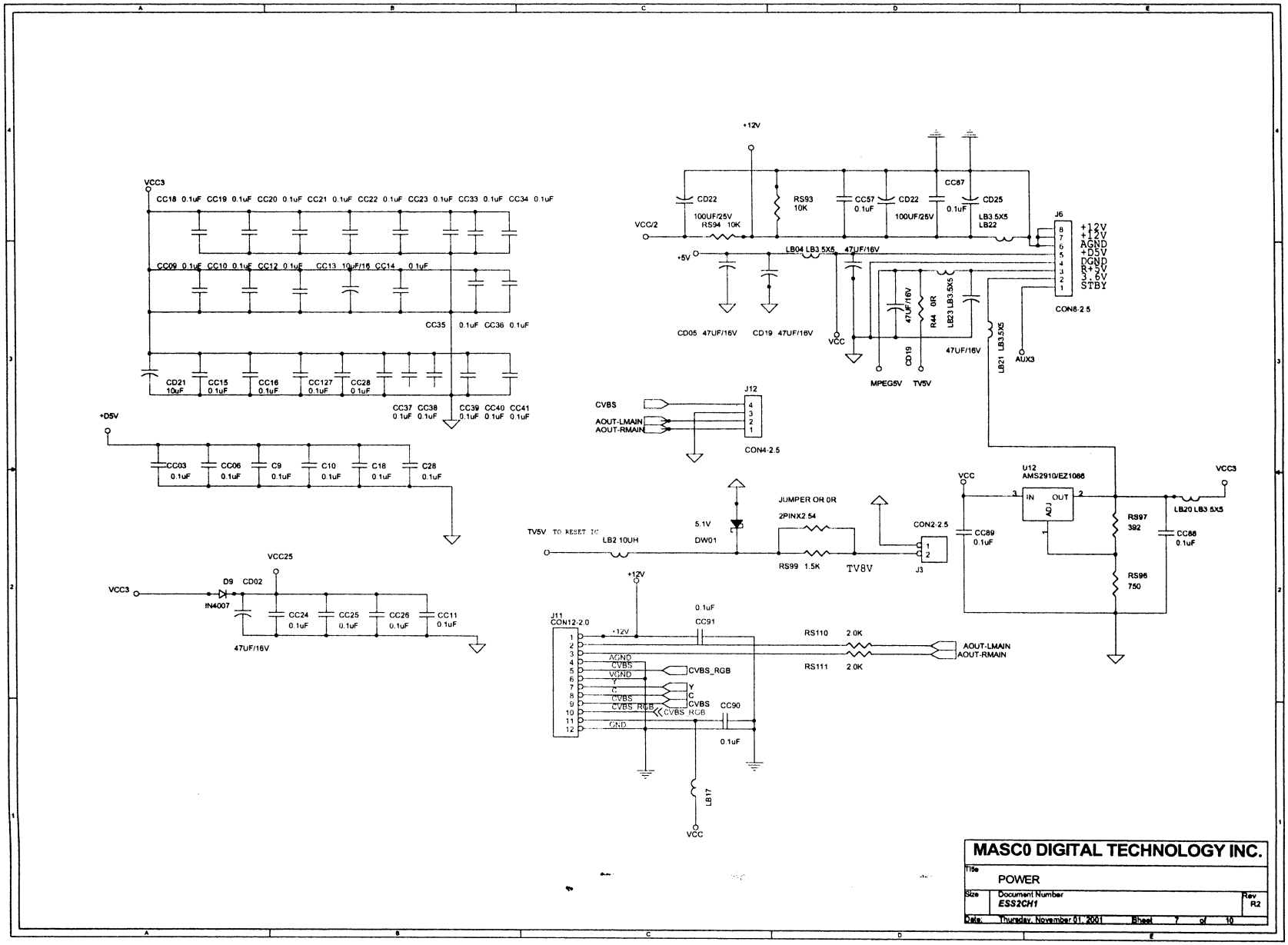
VIDEO / AUDIO ENCODER



MASC0 DIGITAL TECHNOLOGY INC.		
Title: Video/Audio Encoder		
Size	Document Number: ESS2CH1	Rev: R2
Date: Thursday, November 01, 2001	Sheet 7 of 10	

POWER SUPLLY

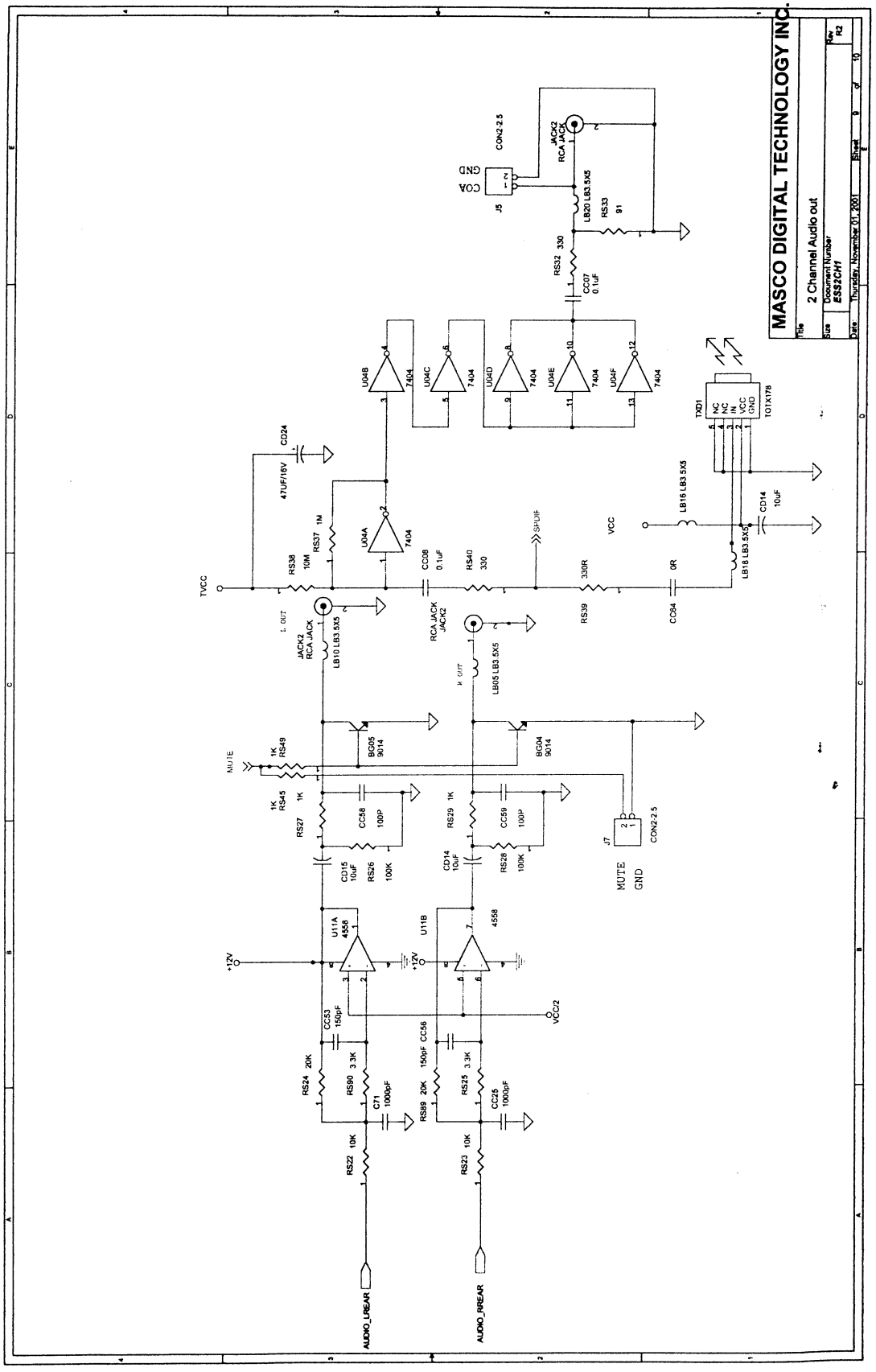




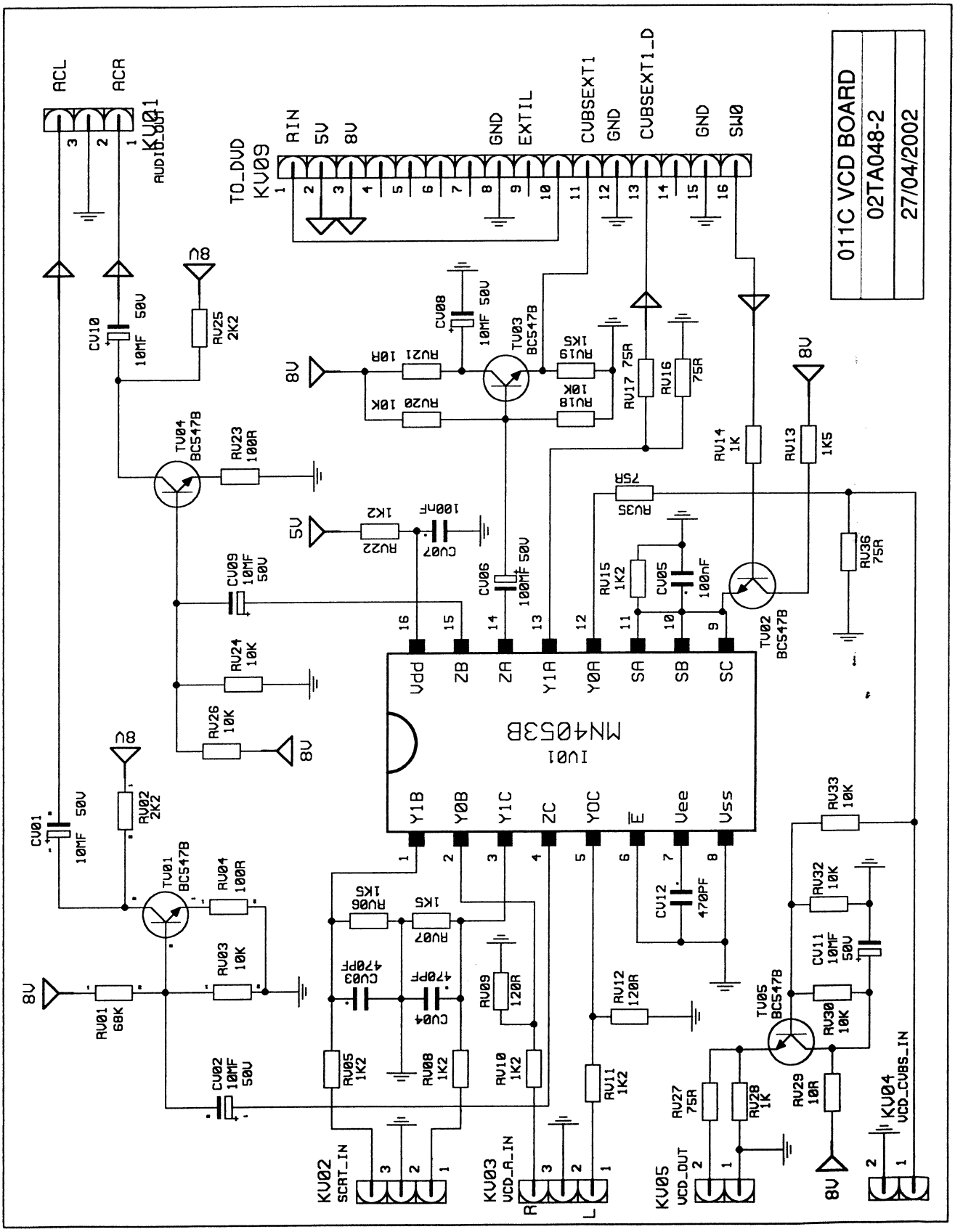
MASC0 DIGITAL TECHNOLOGY INC.

Title	POWER	
Size	Document Number ESS2CH1	Rev R2
Date: Thursday, November 01, 2001	Sheet 7 of 10	

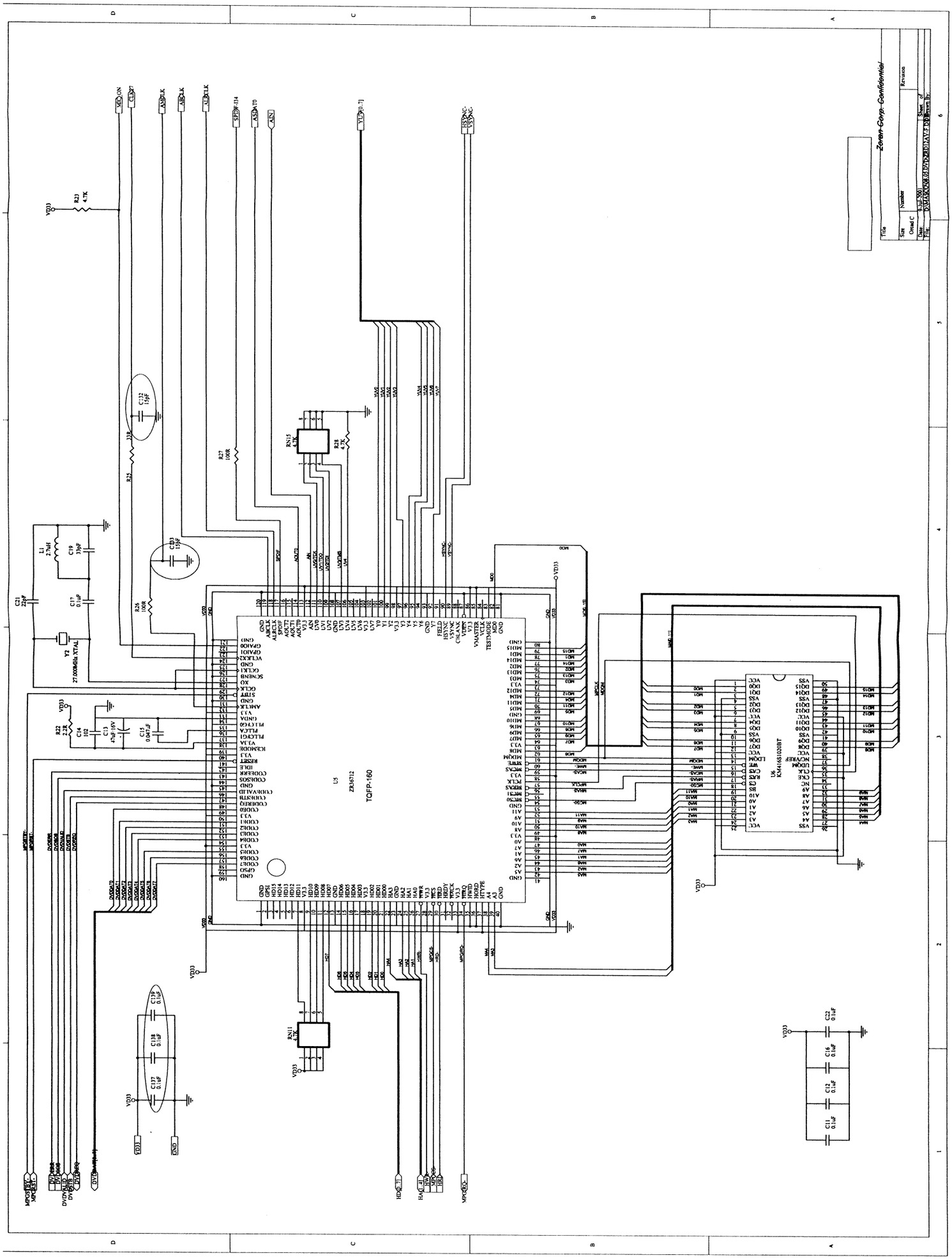
2 CHANNEL AUDIO OUT

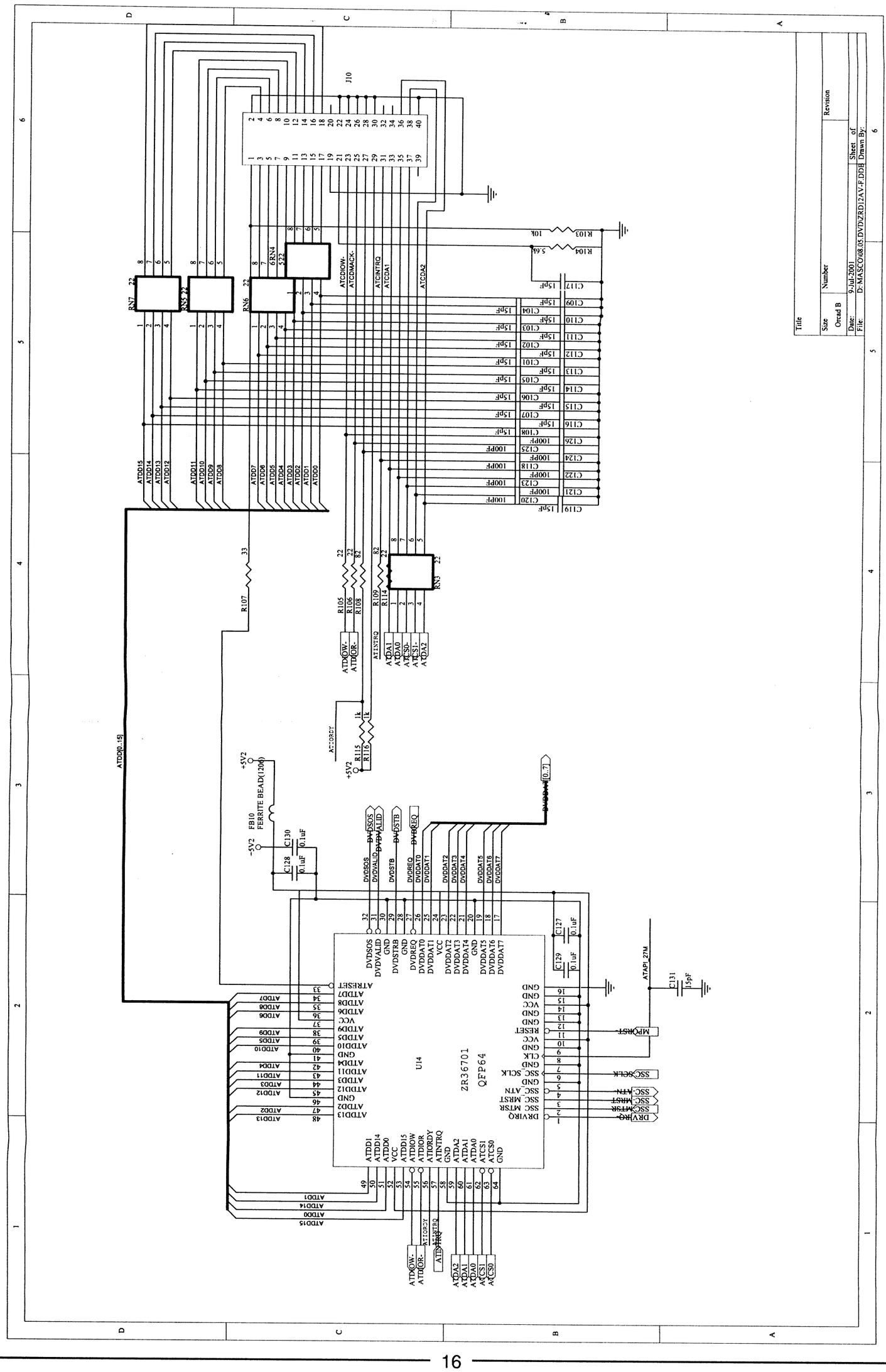


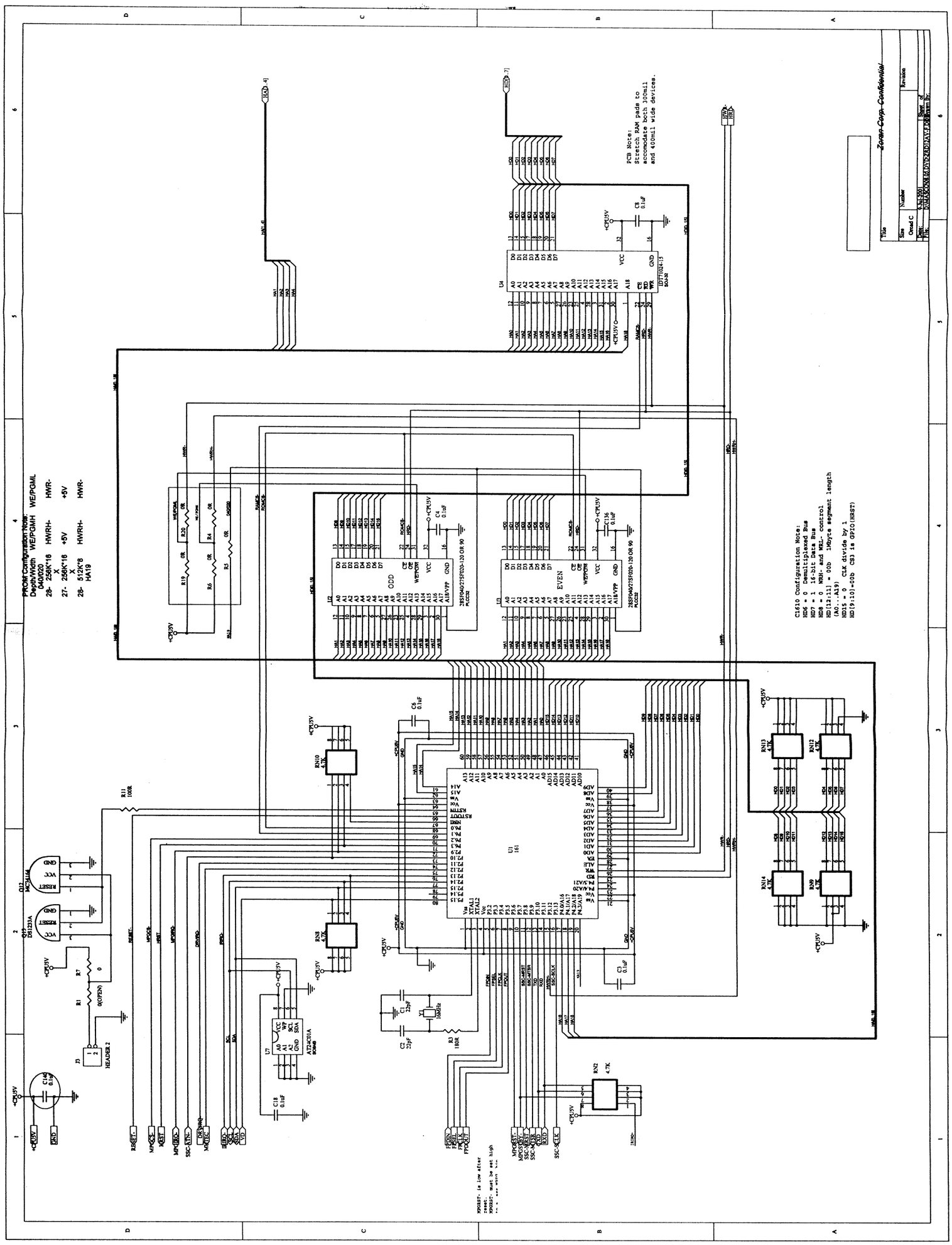
VCD BOARD

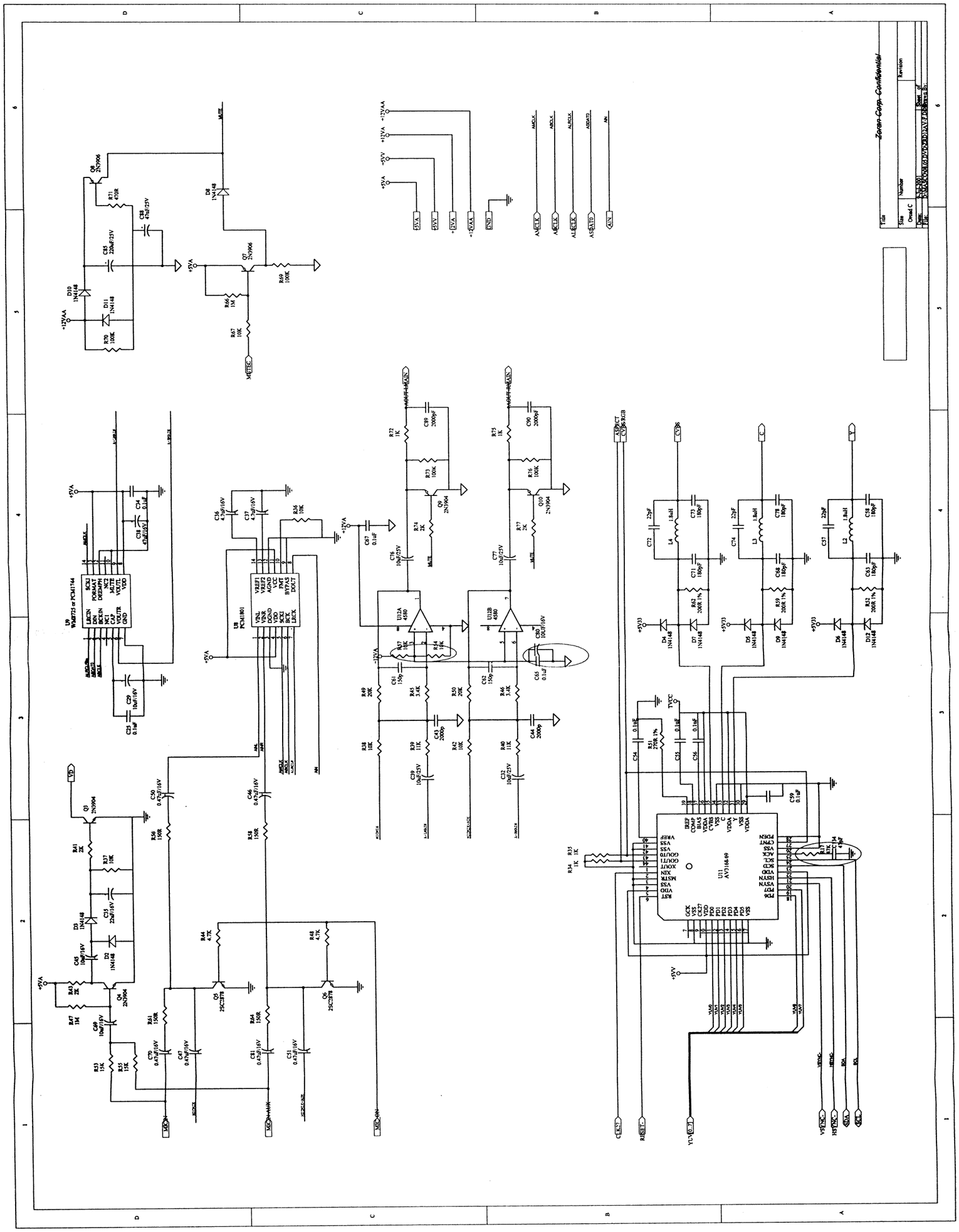

011C VCD BOARD
02TA048-2
27/04/2002
MN4053B
IV01
KV01
AUDIO_OUT
ACL
ACR
KV09
TO_DVD
RIN
5V
8V
GND
EXTIL
CVBSEXT1
CVBSEXT1_D
SW0
KV02
SCRT_IN
KV03
VCD_A_IN
KV04
VCD_CVBS_IN
KV05
VCD_OUT
TV01
TV02
TV03
TV04
TV05
BC547B
CV01
CV02
CV03
CV04
CV05
CV06
CV07
CV08
CV09
CV10
CV11
CV12
RV01
RV02
RV03
RV04
RV05
RV06
RV07
RV08
RV09
RV10
RV11
RV12
RV13
RV14
RV15
RV16
RV17
RV18
RV19
RV20
RV21
RV22
RV23
RV24
RV25
RV26
RV27
RV28
RV29
RV30
RV32
RV33
RV35
RV36

DVD MPEG BOARD




J10
RN7
RN5
RN6
RN4
RN3
U14
ZR36701
QFP64
R103 10K
R104 5.6K
R107 33
R105 22
R106 22
R108 82
R109 82
R114 22
R115 1k
R116 1k
C130 0.1uF
C128 0.1uF
C127 0.1uF
C129 0.1uF
C131 15pF
FB10 FERRITE BEAD(1206)
+5V2
-5V2
ATD[0..15]
ATD[0..7]
ATA[0..2]
ATCS[0..1]
ATDIOW-
ATDIOR-
ATIORDY
ATINTRQ
ATCDIOW-
ATCDMACK-
ATCINTRQ
ATCDA1
ATCDA2
DVD[0..7]
DVDSOS
DVDVALID
DVDSTRB
DVDREQ
DVDDAT0
DVDDAT1
DVDDAT2
DVDDAT3
DVDDAT4
DVDDAT5
DVDDAT6
DVDDAT7
ATAPI_27M
MPRST-
SSC_SCLK
SSC_ATN-
SSC_MRST
SSC_MTSR
DRVIRQ-
Title
Size
Orcad B
Number
Revision
Date: 9-Jul-2001
File: D:\MASCO\08.05.DVD\ZRD12AV-F.DDB
Sheet of
Drawn By:


PROM Configuration Note:
Depth/Width WE/PGMH WE/PGML
040/020
28- 256K*16 HWRH- HWR-
X
27- 256K*16 +5V +5V
X
28- 512K*8 HWRH- HWR-
HA19
PCB Note:
Stretch RAM pads to
accomodate both 300mil
and 400mil wide devices.
C1610 Configuration Note:
HD6 = 0 Demultiplexed Bus
HD7 = 1 16-bit Data Bus
HD8 = 0 WRH- and WRL- control
HD[12:11] = 00b 1Woyte segment length
(A[20:19])
HD15 = 0 CLK divide by 1
HD[9:10]=00b CS3 is GPIO(IRRST)
Zoran Corp Confidential
Title
Size
Number
Revision
Sheet of
Date:
File:
ODD
EVEN
U1
161
ATZ4C01A
DS1233A
MCP1316
HEADER 2
(NOPEN)
ROMCS-
HWR-
HWRH-
HWR_LH
HWR_UH
HRD-
HWRL-
HWRH-
HA19
HA18
HA17
HA16
HA15
HA14
HA13
HA12
HA11
HA10
HA9
HA8
HA7
HA6
HA5
HA4
HA3
HA2
HA1
HA0
HD0
HD1
HD2
HD3
HD4
HD5
HD6
HD7
HD8
HD9
HD10
HD11
HD12
HD13
HD14
HD15
+CPU5V
GND
VCC
RESET
MPCS-
MRST
MPWRRQ
SSC-ATN-
DRDYRQ
MATEC
RESET
MPCS
MRST
MPWRRQ
DRDYRQ
PRQ
SCL
SDA
VD
FDIN
FSEL
FCLK
FFLK
FFLK_SEL
MPRST-
MPCS-
SSC-MRST
SSC-ATN-
TXD
RXD
SSC-CLK
SSC_MRST
SSC_ATN
SSC_SCLK
XTAL1
XTAL2
Vss
Vcc
P3.0
P3.1
P3.2
P3.3
P3.4
P3.5
P3.6
P3.7
P3.8
P3.9
P3.10
P3.11
P3.12
P3.13
P4.0/A16
P4.1/A17
P4.2/A18
P4.3/A19
AD15
AD14
AD13
AD12
AD11
AD10
AD9
AD8
AD7
AD6
AD5
AD4
AD3
AD2
AD1
AD0
ALE
RD-
WR-
RST
EA-
PSEN-
R19 0R
R20 0R
R4 0R
R5 0R
R3 0R
R11 100R
R1 0
R7 0
R13 180R
C1 22pF
C2 22pF
C3 0.1uF
C4 0.1uF
C5 0.1uF
C6 0.1uF
C8 0.1uF
C18 0.1uF
C136 0.1uF
Y1 10MHz
RN2 4.7K
RN8 4.7K
RN10 4.7K
RN12 4.7K
RN13 4.7K
RN14 4.7K
RN9 4.7K
28SF040275FS20-120OR 90
PLCC32
MPRST- is low after
power on and must be set high
MPRST- must be set high
to run user mode.


Zoran Corp. Confidential
Title
Size
Number
Revision
Date:
File:
Sheet of
Drawn By:
+12VAA
+12VA
+5VV
+5VA
-12VAA
END
AMCLK
ADCLK
ALRCLK
ASDATO
AIN
MUTE
MUTEC
Q8 2N3906
Q7 2N3906
D8 1N4148
D10 1N4148
D11 1N4148
R71 470R
C58 47uF/25V
C55 220uF/25V
R70 100K
R66 1M
R67 10K
R69 100K
U9 WM8725 or PCM1744
U8 PCM1801
U12A 4580
U13B 4580
Q9 2N3904
Q10 2N3904
Q1 2N3904
Q4 2N3904
Q5 2SC3578
Q6 2SC3578
U11 AV5168/69
CVBS
C
Y
CVBS_RGB
RESET
CEST
VSYNC
HSYNC
SDA
SCL

SPEC CONFIRMATION
Name: DVD Loader Item No.: DV-9929B

1- INTRODUCTION

DV-9929B is a full-featured and low cost DVD loader; it has the following features.

- ATAPI interface abled.
- DVD□VCD□CVD□SVCD□CD-DA□CD-RW and MP3 discs compatible.
- DVD book and red book compliance, capable of reading single and double layer discs of 120mm and 80mm diameters, including DVD-5, DVD-9 and DVD-18.
- Maximum transfer rate of 870KB/sec reading CD disc.
- Max transfer rate of 2600KB/ sec reading DVD disc.
- 200ms average access time reading CD disc and 180ms reading DVD disc.

2- TECHNICAL SPECIFICATION
2.1 Applicable Discs Format

	Disc Type	Description
Disc Format	DVD-5 (Single Layer) DVD-9 (Double Layer) DVD-10 (Single Layer Double Side) DVD-18 (Double Layer Double Side)	 IS09660 UDE DVD BOOK
	CD	IS09660 RED BOOK (CD-DA) WHITE BOOK (Video-CD) BLUE BOOK (CD Extra) YELLOW BOOK (CD-ROM) ORANGE BOOK (CD-RW, R)
Disc Capacity	DVD-5 DVD-9 DVD-10 DVD-18	4.70 GB 8.54 GB 9.40 GB 17.0 GB
	CD	656 MB (Mode 1) 748 MB (Mode 2)
Disc Diameter	DVD/CD	12 cm/8 cm
Disc Thickness	1.2 mm	
Disc center Aperture	15 mm	
Track Gap	1.6 μm, CD	0.74 μm, DVD

2.2 Functions

2.2.1 Data Transfer Rate:
DVD 2600kB/sec (max)
CD 870kB/sec (max)

2.2.2 Data Buffer Capacity
256KB (DVD/CD)

2.2.3 Error Rate
$10e^{-15}$ MAX (DVD), $10e^{-12}$ MAX (CD)

2.2.4 Reading Time
Starting procedure (Less than 15seconds)
Stopping procedure (Less than 2 Seconds)

2.2.5 Laser Specifications

		DVD	CD
Laser wavelength		650nm	780nm
Laser power		0.5mw	
Object lens	Lens	Non-spherical lens	
	Length of Ray Coil	0.6mm	0.45mm
	Moving Range	1.5mm	1.3mm
Focus		Astigmatism	Knife-edge
Searching		Phase difference detection	Three spot tracking

2.2.6 Disc Loading Mode
Motor- driven front-loading tray

2.2.7 Disc Fixing
Beam magnetic fixation

2.2.8 Reliability
Mean Time Between Failure (MTBF): Not less than 5,000 hours
Mean Time To Repair (MTTR): 0.5 hours

2.3 Working Environment

2.3.1 Temperature and Humidity

Operating temperature	5□ to 45□
Storage temperature	-25□ to 65□
Operating temperature varying	11□/hour(max)
Storage temperature varying	20□/hour(max)
Operating humidity	10% to 80%
Storage humidity	5% to 90%

2.3.2 Vibration

Reading data state	0.5kg 10-30Hz sine wave
Playing CD audio state	0.15kg 10-30Hz random
Standby	2.4kg 10-30Hz random

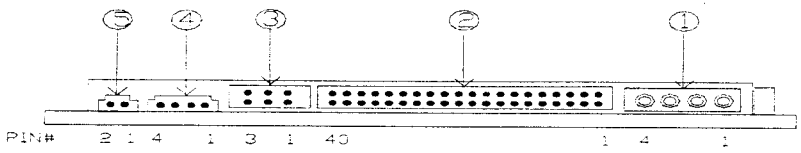
2.3.3 Striking
Standby state 100kg 6ms half sine-wave (in X,Y and Z directions)

2.3.4 Noise
Not more than 42dB in one meter away

3- INTERFACE

3.1 Integrated Connectors

1.DC power jack
2.IDE interface
3. Master/slave mode jumper set (not applicable as the loader configured for player)
4.Analog audio output (not applicable as the loader configured for player)
5.Digital Audio output (not applicable as the loader configured for player)



3.2 Pin Definitions

Power Jack

ITEM	PIN NO.	DESCRIPTION
DC Power Jack	1	+12V
	2	GND
	3	GND
	4	+5V

ATAPI Interface

Signal	Pin No.	Pin Type	Description
CSIEX-	37	I	Driver Chip Select 0
CS3EX-	38	I	Driver Chip Select 1
DA0	35	I	Driver Address Bus-Bit 0
DA1	33	I	Driver Address Bus-Bit 1
DA2	36	I	Driver Address Bus-Bit 2
DASP-	39	I /O	Driver Activity/Driver I Present

ATAPI Interface (Continued)

Signal	Pin No.	Pin Type	Description
DD0	17	I /O	Driver Data Bus-bit 0
DD1	15	I /O	Driver Data Bus-bit 1
DD2	13	I /O	Driver Data Bus-bit 2
DD3	11	I /O	Driver Data Bus-bit 3
DD4	9	I /O	Driver Data Bus-bit 4
DD5	7	I /O	Driver Data Bus-bit 5
DD6	5	I /O	Driver Data Bus-bit 6
DD7	3	I /O	Driver Data Bus-bit 7
DD8	4	I /O	Driver Data Bus-bit 8
DD9	6	I /O	Driver Data Bus-bit 9
DD10	8	I /O	Driver Data Bus-bit 10
DD11	10	I /O	Driver Data Bus-bit 11
DD12	12	I /O	Driver Data Bus-bit 12
DD13	14	I /O	Driver Data Bus-bit 13
DD14	16	I /O	Driver Data Bus-bit 14
DD15	18	I /O	Driver Data Bus-bit 15
DIOR	25	I	Driver I/O Read
DIOW-	23	I	Driver I/O Write
DMACK-	29	I	DMA Acknowledge
DMARQ-	21	O	Driver Request
INTRQ	31	O	Driver 16Bit I/O
IOCS16	32	O	Driver Interrupt
IORDY	27	O	I/O Channel Ready
PDIAG-	34	I/ O	Passed Diagnostics
RESET-	1	I	Driver Reset
CSEL	28		Cable Select
KEYPIN	20		Keying Pin on Interface Connector

3.3 Commands List

ATAPI Packet Command for DVD-ROM Devices

No	Op Code	Command Description
1	12h	Inquiry
2	BDh	Mechanism STATUS
3	55h	Mode Select
4	5Ah	Mode Sense
5	4Bh	Pause/Resume
6	45h	Play Audio
7	A5h	Play Audio(12)
8	47h	Play audio MSF
9	1Eh	Prevent/Allow Medium Removal
10	28h	Read (10)
11	A8h	Read(12)
12	25h	Read CD/DVD Capacity
13	BEh	Read CD
14	B9h	Read CD MSF
15	42h	Read Sub-Channel
16	43h	Play TOC
17	03h	Request Sense
18	2Bh	Seek
19	1Bh	Start Stop Unit
20	00h	Test Unit Ready
21	ADh	Read DVD Structure
22	A4h	Report Key
23	A3h	Send Key
24	4Ah	Get Event Status Notification
25	BCh	Play CD
26	A2h	Send Event
27	51h	Read Disc Information
28	46h	Get Configuration

ATA Command for ATAPPI DVD-ROM Devices

No	Op Code	Command Description
1	08h	ATAPI Soft Reset
2	90h	Execute Drive Diagnostics
3	A0h	ATAPI Packet Command
4	A1h	ATAPI Identify Device
5	EFh	Set Features
6	E1h	Idle Immediate Command
7	E0h	Standby Immediate Command